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

8:00 AM Registration, Back Bay Ballroom D, Sheraton.

9:00 AM (1) Introduction to Python and Sage. Kiran Kedlaya, University of California San Diego

10:30 AM Break.

11:00 AM Question and Answer Session: How do I do XXX in Sage?

2:00 PM (2) Computing with elliptic curves over finite fields using Sage. Ken Ribet, University of California, Berkeley

3:30 PM Break.

4:00 PM Problem Session: Try to solve a problem yourself using Sage.

AMSShort 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

8:00 AM Registration, Back Bay Ballroom D, Sheraton.

9:00 AM (3) Gaussian fields and Kac-Rice formulae. Robert Adler, Technion

10:15 AM Break.


2:00 PM (5) Gaussian models in fMRI image analysis. Jonathan Taylor, Stanford University

3:15 PM Break.

3:45 PM 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.
8:00AM Registration, Back Bay Ballroom D, Sheraton.

9:00AM Polygons: Building blocks of discrete and computational geometry. Satyan Devadoss*, Williams College, and Joseph O'Rourke*, Smith College

10:15AM Break.

10:45AM Triangulations: Flip graphs and Delaunay triangulations. Satyan Devadoss, Williams College

2:00PM Convex hulls: Computing in 2D and 3D. Joseph O'Rourke, Smith College

3:45PM Voronoi diagrams: Geometry, duality, and hulls revisited. Joseph O'Rourke, Smith College

Tuesday, January 3

AMS Department Chairs Workshop

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

8:30 AM – 4:30 PM Gardner, 3rd Floor, Sheraton

Presenter: Marjorie Bond, Monmouth University

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

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. Jared Weinstein, Boston University

10:30AM Break.

11:00AM Computing with the Birch and Swinnerton-Dyer conjecture using Sage. William Stein, University of Washington

2:00PM Computing with elliptic surfaces. Noam Elkies, Harvard University

3:30PM Break.

4:00PM Question and Answer Session: How do I do XXX in Sage?

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

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. Mark Dennis, University of Bristol

10:15AM Break.

10:45AM Random matrices and Gaussian analytic functions. Balint Virag, University of Toronto

2:00PM Random metrics. Dmitry Jakobson, McGill University

3:15PM Break.

3:45PM Discussion groups.

MAA Short Course on Discrete and Computational Geometry, Part II

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. Satyan Devadoss, Williams College

10:15AM Break.

10:45AM Polyhedra from Euler to Gauss to Cauchy, II: Unfolding. Joseph O'Rourke, Smith College

2:00PM Configuration spaces: Locked polygonal chains and particle collisions. Satyan Devadoss, Williams College

2:15PM Break.
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

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

9:00 AM – 5:00 PM | Simmons, 3rd Floor, Marriott
Organizer:  
Michael Gage, University of Rochester

MAA Board of Governors

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

AMS Council

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

Joint Meetings Registration

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

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

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

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. Garcìadiego, Universidad Nacional Autonoma de Mexico (1077-01-82)

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

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_n Boolean Subalgebras. Preliminary report.  
(28) Rebecca M. Steiner, Graduate Center, City University of New York (1077-03-476)

(29) Bonni J Kealy* and David J Wollkind, Washington State University (1077-92-84)
### AMS Special Session on Advances in Coding Theory, I

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<tr>
<td>8:00 AM</td>
<td>Symmetric Group Testing.</td>
<td>Amin Emad*, Jun Shen and Olgica Milenkovic</td>
<td>University of Illinois at Urbana-Champaign (1077-94-1403)</td>
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<td>8:30 AM</td>
<td>On Sums of Locally Testable Affine Invariant Properties.</td>
<td>Eli Ben-Sasson, Haifa, Israel</td>
<td>Georgia Institute of Technology (1077-11-1829)</td>
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<tr>
<td>9:00 AM</td>
<td>Flexible coding schemes with applications to emerging memory technologies.</td>
<td>Lara Dolecek</td>
<td>EE Department, UCLA (1077-94-1779)</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>High-rate Codes with Sublinear-time Decoding.</td>
<td>Swastik Kopparty, Shubhangi Saraf, Sergey Yekhanin*</td>
<td>Michigan State University (1077-68-1057)</td>
</tr>
<tr>
<td>10:00 AM</td>
<td>Codes from separable linearized polynomials and associated Riemann-Roch spaces.</td>
<td>Justin D. Peachey</td>
<td>Clemson University (1077-14-1896)</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>Asymmetric Quantum Codes from Two-Point Divisors on Algebraic Curves.</td>
<td>Martianus Frederic Ezereman</td>
<td>Laboratoire d'Information Quantique, Université Libre de Bruxelles (1077-94-1810)</td>
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### AMS Special Session on Classical Fourier Analysis and Partial Differential Equations, I

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

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

Organizer: Michael Radin, Rochester Institute of Technology

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

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

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

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

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


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

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)

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

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

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


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


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

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

Organizer: P. Robert Kotiuga, Boston University

8:00 AM  Cohomology in electromagnetic modelling. Preliminary report. 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)

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

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

9:30 AM  Cohomology reveals when helicity is a diffeomorphism invariant. 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

8:00 AM – 10:50 AM  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, I

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

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.
Jon M. Conrad*, Cornell University, and Martin D. Smith, Duke University (1077-49-319)

8:30AM
Accounting for Habitat Damage Increases the Economic Optimality of Marine Reserves. Preliminary report.
Holly V. Moeller*, Department of Biology, Stanford University, and Michael G. Neubert, Department of Biology, Woods Hole Oceanographic Institution (1077-92-2201)

9:00AM
Features of biologically realistic fishery models frequently used in fish stock assessment.
Terrance J. Quinn II, Juneau Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks (1077-92-2194)

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

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.
A. L. Dontchev, Mathematical Reviews (1077-49-1302)

8:30AM
A new derivative concept for set-valued functions.
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.
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.
Nhi Nguyen*, Carleton University, and Boris Mordukhovich, Wayne State University (1077-49-2776)

10:00AM
KKT conditions for a nonconvex vector optimization problem.
Miguel Sama*, Bienvenido Jimenez and Vicente Novo, Universidad Nacional de Educaci´on a Distancia (UNED) (1077-90-1507)

10:30AM
Some remarks on stochastic variational inequalities with applications to equilibrium problems.
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

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.
Yunus E Zeytuncu, Texas A&M University (1077-32-656)
### Program of the Sessions – Boston, MA, Wednesday, January 4 (cont’d.)

#### 8:30AM – 10:50AM
**Room 107, Hynes**

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<th>Time</th>
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<tr>
<td>8:00AM</td>
<td>$H^1$ and dyadic $H^1$ in multiparameter settings.</td>
<td>Sergei Treil, Brown University (1077-42-2052)</td>
</tr>
<tr>
<td>9:00AM</td>
<td>Compactness of Hankel operators on convex domains.</td>
<td>Zeljko Cuckovic* and Sonmez Sahutoglu, University of Toledo, Ohio (1077-47-467)</td>
</tr>
<tr>
<td>9:30AM</td>
<td>The spectrum and essential spectrum of Toeplitz operators.</td>
<td>Carl Sundberg, University of Tennessee, and Dechao Zheng*, Vanderbilt University (1077-47-642)</td>
</tr>
<tr>
<td>10:00AM</td>
<td>Fundamental Agler Decompositions.</td>
<td>Kelly Bickel, Washington University (1077-46-677)</td>
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<td>10:30AM</td>
<td>Carleson Measures for Besov-Sobolev</td>
<td>Brett D. Wick, Georgia Institute of Technology (1077-32-798)</td>
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<tr>
<td>8:00AM – 10:50AM</td>
<td>AMS Special Session on Stochastic Analysis (in honor of Hui-Hsiung Kuo), I</td>
<td>Thomas W. Tucker, Colgate University</td>
</tr>
<tr>
<td>8:00AM</td>
<td>Applications of Discrete Morse Theory to Certain Complexes of Bounded Degree Graphs. Preliminary report.</td>
<td>Erica Flapan, Pomona College, Blake Mellor*, Loyola Marymount University, and Ramin Naimi, Occidental College (1077-57-93)</td>
</tr>
<tr>
<td>9:00AM</td>
<td>Rotation systems for 2-complexes in orientable 3-manifolds. Preliminary report.</td>
<td>Thomas Tucker*, Colgate University, Ergun Akleman, Jianer Chen, Texas A&amp;M University, and Jonathan Gross, Columbia University (1077-05-1062)</td>
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#### 10:00AM – 12:20PM
**Room 103, Hynes**

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<tr>
<td>8:00AM</td>
<td>A recent progress in map enumeration.</td>
<td>Mark Ellingham, Vanderbilt University (1077-05-1582)</td>
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<tr>
<td>9:00AM</td>
<td>Abelian coverings of the platonic maps.</td>
<td>Gareth A. Jones, University of Southampton (1077-20-685)</td>
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### AMS Special Session on Trends in Representation Theory, I

#### 8:00AM – 10:50AM
**Room 103, Hynes**

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<td>8:00AM</td>
<td>Kazhdan-Lusztig polynomials for disconnected groups. Preliminary report.</td>
<td>David A. Vogan, MIT (1077-22-87)</td>
</tr>
<tr>
<td>8:30AM</td>
<td>Generalized Harish-Chandra Modules for Mixed Subgroups.</td>
<td>Annegret Paul, Western Michigan University, Siddhartha Sahi, Rutgers University, and Wai Ling Yee*, University of Windsor (1077-22-1916)</td>
</tr>
<tr>
<td>9:00AM</td>
<td>Unipotent representations for $Sp(p,q)$ and $O^*(n)$. Preliminary report.</td>
<td>Annegret Paul, Western Michigan University (1077-22-1044)</td>
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#### 8:00AM – 10:50AM
**Room 102, Hynes**

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<td>9:00AM</td>
<td>Sergio R. Lopez-Permouth, California State University, and Magda Peligrad, Purdue University (1077-47-1283)</td>
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<tr>
<td>10:00AM</td>
<td>Marshall A. H. Leedham-Green, University of Auckland, and Paul C. Su, University of Auckland (1077-47-1283)</td>
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### AMS Special Session on Topological Graph Theory: Structure and Symmetry, I

#### 8:00AM – 10:50AM
**Room 102, Hynes**

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

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**Room 102, Hynes**

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<tr>
<td>8:00AM</td>
<td>Abstracts</td>
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<td>9:00AM</td>
<td>Preliminary report.</td>
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<tr>
<td>10:00AM</td>
<td>Preliminary report.</td>
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10:00 AM – 10:50 AM Room 302, Hynes

Organizer: Seth Sullivan, North Carolina State University

8:00 AM What is an algebraic statistical model?

Luis David Garcia-Puente, Sam Houston State University (1077-AA-1821)

AMS Invited Paper Session on Algebraic Statistics

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)

Lefschetz Functors for the Metaplectic Group.
Benjamin Trahan, University of Utah (1077-22-1415)

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

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

8:00 AM The Separability Problem in Referendum Elections: Some Recent Developments.
Jonathan K. Hodge, Grand Valley State University (1077-91-651)

8:30 AM A Failure of Representative Democracy.
Katherine A Baldiga, Harvard University (1077-91-75)

9:00 AM Variable-population voting rules.
Marcus J. Pivato, Trent University (1077-91-133)

9:30 AM 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, Xueming Zhao and Xinjing Zhu, Mount Holyoke College (1077-91-126)

10:00 AM Symmetry in Voting Theory: The Borda-Kemény Spectrum and Beyond.
Karl-Dieter Crisman, Gordon College (1077-91-1410)

10:30 AM The geometry of influence: weighted voting and hyper-ellipsoids.
Nicolas Houy, Ecole Polytechnique, France, and William S. Zwicker*, Union College (1077-91-580)

8:30 AM Hypothesis testing on tensors.
Preliminary report.
Dustin Cartwright, Yale University (1077-AA-2393)

9:00 AM Graphical models and monoidal categories. Preliminary report.
Jason Morton, Penn State (1077-AA-2366)

9:30 AM Binary Cumulant Varieties.
Bernd Sturmfels*, UC Berkeley, and Poitr Zwiernik, IPAM UCLA (1077-AA-34)

10:00 AM Betti numbers of ideals from graphs.
Alexander Engström, Aalto University (1077-AA-2461)

10:30 AM 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 Session on Combinatorics and Graph Theory, I

8:00 AM – 10:10 AM Room 111, Hynes

8:00 AM On Steinhaus Set of Four Points in $\mathbb{R}^2$.
Preliminary report.
Mingzhi Xuan, University of North Texas (1077-05-790)

8:15 AM An alternate proof that any graph that is $m,n$-colorable is decomposable into two graphs that are $m$-colorable and $n$-colorable, respectively. Preliminary report.
Liam Rafferty, University of Montana (1077-05-2903)

8:30 AM Jack Symmetric Functions and the Orientability of Rooted Maps.
Michael Andrew La Croix, Boston, MA (1077-05-2890)

8:45 AM 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)

9:00 AM Using Ehrhart theory for solving combinatorial problems. Preliminary report.
Felix Breuer, San Francisco State University (1077-05-2874)

Yezhou Wu* and Cun-Qun Zhang, ook Virginia University (1077-05-2784)

9:30 AM Quasi-residual and quasi-derived Hadamard designs. Preliminary report.
Tariq A Alaqa*, Northern State University, and Mohan Shrikhande, Central Michigan University (1077-05-1235)

9:45 AM 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.)

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

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
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<tbody>
<tr>
<td>8:00 AM</td>
<td>Picard group of dual operator algebras. Preliminary report.</td>
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<tr>
<td>8:15 AM</td>
<td>Shrinking and Boundedly complete frames for Banach spaces.</td>
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<tr>
<td>8:30 AM</td>
<td>Boundaries for operator systems.</td>
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<tr>
<td>8:45 AM</td>
<td>On locally $B^*$-algebras.</td>
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<tr>
<td>9:00 AM</td>
<td>Research Experiences in Quantum Information Systems. Preliminary report.</td>
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<tr>
<td>9:15 AM</td>
<td>Prime $E_0$-semigroups.</td>
</tr>
<tr>
<td>9:45 AM</td>
<td>On a version of dual space characterization of real Locally $C^*$-algebras.</td>
</tr>
</tbody>
</table>

### AMS Session on History and Philosophy of Mathematics

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:00 AM</td>
<td>Translating the Elements into Sanskrit: Jagannātha’s Rekhaganita.</td>
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<tr>
<td>8:15 AM</td>
<td>Cryptanalysis vs Calvary. Preliminary report.</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:00 AM</td>
<td>On non-exponential models of prebiological evolution.</td>
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<tr>
<td>8:30 AM</td>
<td>Health safety nets can break cycles of poverty and disease: a stochastic ecological model. Calistus Nghe Ndongala, National Institute for Mathematical and Biological Synthesis (NIMBioS) (1077-92-2714)</td>
</tr>
<tr>
<td>8:45 AM</td>
<td>Measuring Information Storage and Transfer in Swarms. 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)</td>
</tr>
</tbody>
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8:00 AM – 9:55 AM Room 208, Hynes

8:00 AM – 9:45 AM Room 105, Hynes
AMS Session on Mechanics and Mathematical Physics, I

8:00 AM – 10:10 AM  Room 303, Hynes

9:15 AM  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)


9:45 AM  A continuum model for the simultaneous growth and deformation of biofilms.  Jared A. Hicks* and David L. Chopp, Northwestern University (1077-92-2794)

10:00 AM  MicroRNA Target Modeling via Clustering of mRNA Microarray Data. Preliminary report.  Frederick A Adkins, Indiana University of Pennsylvania (1077-92-2778)

AMS Session on Ordinary Differential Equations and Special Functions

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

8:00 AM  Bifurcation of Solutions to a Second Order Nonlinear Singular Differential Equation from Boundary Layer Theory.  Chunqing Lu, Southern Illinois University Edwardsville (1077-34-160)

8:15 AM  Competition between two phytoplankton species under predation and allelopathic effects.  Jean-Jacques Kengwoung-Keumo, New Mexico State University, Las Cruces (1077-34-2754)

8:30 AM  On the Solvability of Nonlinear Sturm-Liouville Problems.  Zachary J. Abernathy*, Winthrop University, and Jesus Rodriguez, North Carolina State University (1077-34-1940)


9:00 AM  Stability of solutions for fractional differential equations.  Namji Koo* and Sung Kyu Choi, Chungnam National University, Daejeon, South Korea (1077-34-1794)

9:15 AM  Role of CD4+ T-cell proliferation in HIV infection under antiretroviral therapy. Preliminary report.  Hongying Shu* and Lin Wang, University of New Brunswick (1077-34-1278)


10:00 AM  On the asymptotic behavior of the solutions to the replicator equation.  Faina Berezovskaya, Howard University (1077-34-2231)
**AMS Session on Probability Theory, Stochastic Processes, and Statistics, I**

8:00 AM – 10:25 AM  Room 209, Hynes

- **8:00 AM**  
  Probability measures on the space of persistence diagrams.  
  Yuriy Milleyko, Sayan Mukherjee, and John Harer, Duke University (1077-60-2532)

- **8:15 AM**  
  Numerical methods for stochastic differential equations.  
  Robert D Wooster, West Point (1077-60-2480)

- **8:30 AM**  
  On the Volatility of Binomial Option Pricing Model.  
  Constantine Georgakis, DePaul University (1077-60-2372)

- **8:45 AM**  
  How fed policy makes financial markets chaotic or not.  
  James M. Haley, Point Park University (1077-60-2935)

- **9:00 AM**  
  The rate of decay of the Wiener sausage in a local Dirichlet space.  
  Lee R Gibson, Indiana University - Southeast, and Melanie A Pivarski, Roosevelt University (1077-60-2751)

- **9:15 AM**  
  Encoding and Counting Strings.  
  Jennifer D Herdan and Melinda Lanius, East Tennessee State University (1077-60-2749)

- **9:30 AM**  
  Bistable systems with Stochastic Noise: Virtues and Limits of effective Langevin equations for the Thermohaline Circulation strength.  
  Valerio Lucarini, Klimcamus, University of Hamburg (1077-60-2523)

- **9:45 AM**  
  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)

- **10:00 AM**  
  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)

- **10:15 AM**  
  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**  
  Algebraic Tchoukaillon Representations.  
  Fanya Wyrick-Flax, Bard College, and Benjamin Warren, Ramapo College of New Jersey (1077-00-1424)

- **8:15AM**  
  Adinkra Phase Graphs.  
  Jasper O Weinrich-Burd, Bard College (1077-00-2221)

- **8:30AM**  
  Mathematics of Sowing Games.  
  Spencer O Sims, Oakwood University, Amanda Fernandez, Qian Zhang, Tyesha Hall and Mikias Kidane, James Madison University (1077-00-2282)

- **8:45AM**  
  Periodicity and asymptotics of Tchoukaillon sequences.  
  David Creech, Central Michigan University, and Jeff Anway, Longwood University (1077-00-2894)

- **9:00AM**  
  The Magic Behind Franklin Magic Circles.  
  Maximino Aviles Montes, Katie Watkins and Tatiana Kovyrsheva, Sam Houston State University (1077-01-2224)

- **9:15AM**  
  AN EPQ Model for Deterioration Items and Exponential Demand Rate Taking into Account the Time Value of Money.  
  Vikram Jeet Singh, Dehradun (1077-03-2928)

- **9:30AM**  
  Families of Half-Transitive Graphs.  
  Nate R Harman, University of Massachusetts Amherst (1077-05-1966)

- **9:45AM**  
  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**  
  A Turán-type Problem for Circular Arc Graphs.  
  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**  
  Limits of Picture Sequences.  
  Craig M. Johnson, Marywood University (1077-B1-1047)

- **8:20AM**  
  Using Escher's Work to Demonstrate Symmetries of the Plane.  
  Jeffrey W Clark, Elon University (1077-B1-92)
8:00 AM – 10:55 AM Back Bay Ballroom C, 2nd Floor, Sheraton

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

8:00 AM Exploring regressions through Geometer’s Sketchpad and Microsoft Excel. Preliminary report.
Brandon Milonovich, Syracuse University (1077-D5-1201)

8:20 AM Using Geometer’s Sketch Pad to examine whether the SSA condition in Euclidean geometry is always ambiguous.
Jennifer Bergner, Salisbury University (1077-D5-1700)

8:40 AM From Dilation to Similarity - an Exploration Using Geometer’s Sketchpad.
Margaret L. Morrow, SUNY Plattsburgh (1077-D5-2828)

9:00 AM Epsilons and Deltas with GeoGebra.
Jason McCullough, University of California, Riverside (1077-D5-1499)

9:20 AM The Euler Line in GeoGebra.
Philip P. Mummert, Taylor University (1077-D5-1769)

8:40 AM A family of butterfly patterns. Preliminary report.
Douglas Dunham, University of Minnesota Duluth (1077-B1-2738)

9:00 AM 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)

9:20 AM Polyhedral Modularity in a Special Class of Decagram Based Interlocking Star Polygons. Preliminary report.
Reza Sarhangi, Towson University, Maryland (1077-B1-451)

9:40 AM Recreating a 14th Century 14-Pointed Star Polygon Design Found on the Mimbar of the Mausoleum of Baraqu in Egypt.
B Lynn Bodner, Monmouth University (1077-B1-430)

10:00 AM Stigmetry Prints. Preliminary report.
Gary R Greenfield, University of Richmond (1077-B1-868)

10:20 AM Between pattern and chance.
Andrew K Brodzik, The MITRE Corporation (1077-B1-290)

10:40 AM Variation of Parameters. Preliminary report.
Anne M. Burns, Long Island University, C.W. Post Campus (1077-B1-355)

9:40 AM 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)

10:00 AM Rolling Wheels: Explore Curve Sketching via GeoGebra and Mathematica.
David A. Brown, Ithaca College (1077-D5-468)

10:20 AM Motions and Rates: Using GeoGebra to Analyze Video Recordings.
Tibor Marcinek, Central Michigan University (1077-D5-2854)

10:40 AM 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

8:00 AM Streaking: Finding the probability for various batting streaks.
Stanley Rothman, Quinnipiac University (1077-G1-618)

8:20 AM What is the True Probability of Getting a Hit?
Jeffrey W. Heath* and Ian M. Powell, Centre College (1077-G1-1114)

8:40 AM 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)

9:00 AM 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)

9:20 AM Beyond Regression: Using Learning Machines to Predict NBA Performance.
Andrew Larsen* and Kali Wickens, Westminster College, Salt Lake City, UT (1077-G1-1417)

9:40 AM Pursuing an optimal statistically-based model for NFL prediction.
Andrew D. Blakie*, Gabriel J. Abud, College of Wooster, John A. David, Virginia Military Institute, and R. Drew Pasteur, College of Wooster (1077-G1-1467)

10:00 AM Boxing in Basketball: A Round-By-Round Analysis of the College Game.
Paul P. Britton* and Carl R. Yerger, Davidson College (1077-G1-738)
### 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

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>8:00AM</td>
<td>Using Error-Eliciting Problems via a Classroom Voting System in a Capstone Course to Foster Conceptual Understanding and Mathematical Habits of Mind.</td>
<td>Kien H Lim, University of Texas at El Paso (1077-C1-27)</td>
</tr>
<tr>
<td>8:00AM</td>
<td>From Fred Flintstone to Ferraris, Driving Mathematical Content through Questioning</td>
<td>Debbie Cochenaur, Shippensburg University (1077-N1-2866)</td>
</tr>
<tr>
<td>8:20AM</td>
<td>They Can Do It: Applications of a Hybrid Classroom Model in a Traditional Classroom.</td>
<td>Lee Evans*, Heather Jackson, Christopher Weld and Gerald Kobylski, United States Military Academy (USMA) (1077-N1-2490)</td>
</tr>
<tr>
<td>8:40AM</td>
<td>Smartpen Technology as an Instructional Medium. Preliminary report.</td>
<td>Jennifer A Czocher* and Jenna Tague, The Ohio State University (1077-N1-1899)</td>
</tr>
<tr>
<td>9:00AM</td>
<td>Using and Analyzing Student Confidence in Classroom Voting. Preliminary report.</td>
<td>Ann C. Stewart, Hood College (1077-N1-2058)</td>
</tr>
<tr>
<td>9:20AM</td>
<td>Helping Algebra Students Succeed at Word Problems. Preliminary report.</td>
<td>Ibrahim A. Saleh* and Andrew G. Bennett, Kansas State University (1077-N1-2040)</td>
</tr>
<tr>
<td>9:40AM</td>
<td>Outside of Class Learning: Perspectives on Mathematics Tutoring Programs at a Community College. Preliminary report.</td>
<td>C. Adam Feldhaus* and David L. Reddy, Columbus State Community College (1077-N1-1364)</td>
</tr>
<tr>
<td>10:00AM</td>
<td>Role of Prerequisite Knowledge in Student Learning in Lower Level Mathematics Courses.</td>
<td>Anne Albert, The University of Findlay (1077-N1-2660)</td>
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### MAA Session on the Capstone Course: Innovations and Implementations, I

**8:00 AM – 10:55 AM**

Room 310, Hynes

Organizers: Kathryn Weld, Manhattan College

<table>
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<tr>
<td>8:00AM</td>
<td>Capstone Course: Why it didn’t work for us.</td>
<td>Sandra Fillebrown, Saint Joseph’s University (1077-C1-437)</td>
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<tr>
<td>8:20AM</td>
<td>Problem Seminar: A Capstone Course.</td>
<td>Kathryn Weld, Manhattan College (1077-C1-1764)</td>
</tr>
<tr>
<td>8:40AM</td>
<td>The Right Model Makes All The Difference! Preliminary report.</td>
<td>Rachel Esselstein, California State University, Monterey Bay (1077-C1-668)</td>
</tr>
<tr>
<td>9:00AM</td>
<td>A Course in Experimental Mathematics.</td>
<td>Marc Chamberland, Grinnell College (1077-C1-2531)</td>
</tr>
<tr>
<td>10:00AM</td>
<td>A Capstone Course for Secondary Education Students.</td>
<td>Rosemary C Farley, Manhattan College (1077-C1-1673)</td>
</tr>
<tr>
<td>10:20AM</td>
<td>Showcasing students’ mathematical understanding through portfolios: A capstone course for mathematics majors on a secondary teaching track.</td>
<td>Pete Johnson* and Hari P. Koirala, Eastern Connecticut State University (1077-C1-181)</td>
</tr>
</tbody>
</table>
10:40 AM Using Data to Develop an Adaptive Syllabus for PreCalculus Course at the College of Staten Island, City University of New York.
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
8:00 AM – 10:40 AM Room 312, Hynes
Organizers: Jennifer Beineke, Western New England College
Lynette Boos, Providence College
Aliza Steurer, Dominican University

8:00 AM  
On the intersection spectrum conjecture.  
C. A. Marx, University of California, Irvine (UCI) (1077-VH-1396)

8:15 AM  
A Study of Hudson Food Web and its Bisections of graphs.  
Urmil Ghosh-Dastidar*, NYCC, CUNY, Margaret Cozzens, DIMACS, Rutgers University, Steven Lora and Alma Cabral-Reynoso, NYCCC, CUNY (1077-VH-2851)

8:30 AM  
Asymptotically normal distribution of some tree families relevant for phylogenetics.  
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)

8:45 AM  
The mechanisms behind the evolution of cooperation.  
Candace Ohm, Florida State University (1077-VH-1711)

9:00 AM  
Mathematics in Computed Tomography.  
Mohamed Allali, Chapman University (1077-VH-2024)

9:15 AM  
Model for self-polarization and motility of keratocyte fragments.  
Falko Ziebert, Physikalisches Institut, Sumant Bhaskaranathan*, Northwestern University, and Igor Aronson, Argonne National Laboratory (1077-VH-2882)

9:30 AM  
Computing Stable Models of Logic Programs Using Metropolis Type Algorithms.  
Jeffrey Remmel and Alex Brlik*, UC San Diego (1077-VH-1789)

9:45 AM  
A course on pre-Hispanic Latin American Mathematical Ideas.  
Preliminary report.  
Colleen Duffy, University of Wisconsin - Eau Claire (1077-VH-657)

10:00 AM  
A course in spherical geometry and its applications for math majors.  
Preliminary report.  
Marshall A Whittlesey, California State University San Marcos (1077-VH-1708)

10:15 AM  
Creating an Institutional Interdisciplinary Program of the Sessions
Program of the Sessions – Boston, MA, Wednesday, January 4 (cont’d.)

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

8:15 AM (266)
New Results in Calibrated Geometry.
Yongsheng Zhang, Stony Brook Univ.
(1077-VJ-2632)

8:30 AM (277)
Geometry of cubics. Preliminary report.
Sam Northeild, SUNY-Plattsburgh
(1077-VJ-2717)

8:45 AM (278)
Minimum-size convex decompositions in d dimensions.
Carlos M. Nicolas, UNC-Greensboro
(1077-VJ-1737)

9:00 AM (279)
A Characterization of Homeomorphisms on Cantor Sets by Orbit Structures.
Casey L Sherman, Baylor University
(1077-VJ-2191)

9:15 AM (280)
The Log-Convex Density Conjecture and vertical surface area in warped products.
Sean P Howe, Leiden University
(1077-VJ-992)

9:30 AM Break.

9:45 AM (281)
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)

10:00 AM (282)
Moment Formulas for Ensembles of Classical Compact Groups.
Steven J. Miller*, Williams College, and Geoffrey S Iyer, University of Michigan
(1077-VJ-1903)

10:15 AM (283)
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)

10:30 AM (284)
A functional equation for a prehomogeneous vector space and unitary representations of GL(2n, R).
Juhyun Lee, Oklahoma State University
(1077-VJ-2856)

10:45 AM (285)
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

- **8:20 AM**  
Preliminary report.  
Richard D Summers, Reinhardt University (1077-O1-565)

- **8:40 AM**  
A Photographic Assignment for Abstract Algebra.  
Gregory S. Warrington, University of Vermont (1077-O1-1543)

- **9:00 AM**  
The Parity Theorem Shuffle.  
Michael D Smith, Lycoming College (1077-O1-366)

- **9:20 AM**  
Active Learning in Discrete Mathematics.  
Ann N Trenk, Wellesley College (1077-O1-1518)

- **9:40 AM**  
Loaded Dreidels. Preliminary report.  
Allan Struthers, Michigan Technological University (1077-O1-1518)

- **10:00 AM**  
Rolling the Dice in Statistics.  
Heidi N Hulsizer, Hampden-Sydney College (1077-O1-1702)

### 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

- **8:30 AM**  
Estimates and wellposedness for magnetic Schrödinger equations and related systems. Preliminary report.  
Magdalena Czubak, Binghamton University (SUNY) (1077-O1-2478)

- **9:00 AM**  
On Schrödinger maps from $T^1$ to $S^2$.  
R. L. Jerrard*, University of Toronto, and D. Smets, Université Pierre et Marie Curie (1077-O1-2332)

- **9:30 AM**  
Asymptotic stability of solitary waves in a water wave model with indefinite variational structure. Preliminary report.  
Robert L. Pego*, Carnegie Mellon University, Tetsu Mizumachi, Kyushu University, and José Raúl Quintero, Universidad del Valle (1077-O1-1991)

- **10:00 AM**  
Birkhoff normal forms and scattering for the NLS on $\mathbb{R}^d$. Preliminary report.  
Walter Craig, McMaster University (1077-O1-1223)

### 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

- **8:30 AM**  
Money, That’s What I Want! Preliminary report.  
Peter T. Olszewski, Penn State Erie, The Behrend College (1077-VB-1381)

- **8:45 AM**  
Pass with CARE (Clicking Algebra-Related Education). Preliminary report.  
Jerry J. Chen* and Myung-Chul Kim, Suffolk County Community College (1077-VB-1495)

- **9:00 AM**  
Teaching using the iPad and Air Sketch.  
Jason A Price, Nichols College (1077-VB-976)

- **9:30 AM**  
Stefanos Orfanos, KFUPM (1077-VB-1541)

- **9:45 AM**  
Why Should Any Students Take Developmental Math?  
Sheldon P Gordon, Farmingdale State College (1077-VB-1910)

- **10:00 AM**  
Improving Student Success in Developmental Algebra and Its Impact on Subsequent Mathematics Courses. Preliminary report.  
William O Bond* and John C Mayer, University of Alabama at Birmingham (1077-VB-2025)

- **10:45 AM**  
Growing a Learning Center: From a small, underfunded closet to a popular learning space.  
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.)

MAA Minicourse #6: Part A
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
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
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
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
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
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
9:00 AM - 5:00 PM 2nd Floor Corridor by Veterans Auditorium, Hynes

MAA Department Liaisons Meeting
9:30 AM - 11:00 AM Salon E, 4th Floor, Marriott

AMS Invited Address
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
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
12:15 PM - 5:30 PM Exhibit Hall D, Hynes

AMS Colloquium Lectures: Lecture I
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)
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 Viete.
Karen V. H. Parshall, University of Virginia (1077-01-193)

2:45PM
▶
(312) Newton and the Neo-Pythagorean Tradition.
Nico1o 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
▶
Jeff A Suzuki, Brooklyn College (1077-01-73)

4:15PM
▶
(315) Boscovich and the Line of Best Fit.
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
▶
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
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
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
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

2:15PM
(319) Anderson Acceleration for Fixed-Point Iterations.
Homer F. Walker, Worcester Polytechnic Institute (1077-65-1285)

2:45PM
Xinghui Zhong* and Chi-Wang Shu, Brown University (1077-65-460)

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5:45PM
Qi Ye*, Gregory Fasshauer and Igor Cialenco, Illinois Institute of Technology (1077-35-327)
AMS-AAAS Special Session on Science for Policy and Policy for Science: Career Opportunities at the Intersection of Science and Policy

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

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

2:15 PM  Opportunities at the intersection of science and policy.
Cynthia Robinson, American Association for the Advancement of Science (1077-00-1074)

2:45 PM  Applying mathematical tools in public policy.
Sonja Sandberg, Framingham State University (1077-00-1614)

3:15 PM  Is there mathematical work to be done on Capitol Hill?
Daniel H Ullman, George Washington University (1077-00-1844)

3:45 PM  Careers in Math Policy.
Katherine Socha, Math for America (1077-00-1617)

4:15 PM  non-partisan call to arms.
David Weinreich, Washington, DC (1077-00-1883)

AMS Special Session on Advances in Coding Theory, II

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

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

2:15 PM - 5:35 PM  Room 104, Hynes

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

2:15 PM  Global harmonic analysis of eigenfunctions in the real and complex domain. Preliminary report.
Steve Zelditch, Northwestern University (1077-35-710)

3:15 PM  Gibbs phenomena and Pinsky phenomena for solutions to nonlinear Schrodinger equations.
Michael E. Taylor, University of North Carolina (1077-35-489)

4:15 PM  On the Pinsky phenomenon and the Kahane theorem for nonspherical partial Fourier integrals.
Ravshan R Ashurov* and Almaz A Butaev. University Putra Malaysia (1077-42-333)

4:45 PM  A relation between multiple Fourier series and lattice point problems.
Shigehiko Kuratsubo, Mathematical Society of Japan, Hirosaki University (1077-42-477)
AMS Special Session on Difference Equations and Applications, II

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>2:15 PM</td>
<td>Estimates of Fourier Transforms.</td>
<td>William O. Bray, University of Maine (1077-42-1239)</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>On the Nature of Solutions of the Difference Equation $x_{n+1} = x_n x_{n-3} - 1$.</td>
<td>Candace M. Kent*, Virginia Commonwealth University, and Witold Kosmala, Appalachian State University (1077-39-1500)</td>
</tr>
<tr>
<td>5:15 PM</td>
<td>The Global Characteristics of a Family of Systems of Piecewise Linear Difference Equations.</td>
<td>E Grove, G Ladas, University of Rhode Island, E Lapierre*, Johnson &amp; Wales University, and W Tikhja, Mahidol University (1077-39-794)</td>
</tr>
<tr>
<td>5:45 PM</td>
<td>Positive solutions for a system of second order multipoint discrete boundary value problems.</td>
<td>Johnny Henderson*, Baylor University, and Rodica Luca, Gh. Asachi Technical University (1077-39-30)</td>
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AMS Special Session on Dynamical Systems in Algebraic and Arithmetic Geometry, II

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<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>2:15 PM</td>
<td>Fractal structures in functions related to number theory.</td>
<td>Jeffrey C. Lagarias, University of Michigan (1077-11-1469)</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>Complex Dimensions of Cantor Strings and the Riemann Zeros.</td>
<td>Preliminary report. Machiel van Frankenhuijzen, Utah Valley University (1077-11-2341)</td>
</tr>
</tbody>
</table>
Program of the Sessions – Boston, MA, Wednesday, January 4 (cont’d.)

3:15 PM – 5:55 PM Provincetown, 4th Floor, Marriott
Organizer: P. Robert Kotiuga, Boston University

2:15 PM Computing integrals using equivariant cohomology.
Loring W. Tu, Tufts University
(1077-55-2256)

Paul Frank Baum, Penn State University
(1077-19-400)

4:15 PM Fractional topological states in electronic flattened bands with non-zero Chern number.
Claudio Chamon, Boston University
(1077-82-2306)

P. Robert Kotiuga, Boston University
(1077-18-2400)

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

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

2:15 PM Polynomial-time Theory of Matrix Groups.
László Babai*, University of Chicago,
Robert Beals, Renaissance Technologies, and Ákos Seress, Ohio State University
(1077-20-1481)

2:45 PM Stackable groups. Preliminary report.
Mark Brittenham and Susan Hermiller*, University of Nebraska
(1077-20-834)

Vladimir Shpilrain, The City College of New York
(1077-94-1322)

3:45 PM Subgroups of semigroups freely generated by idempotent matrices. Preliminary report.
John C. Meakin, University of Nebraska-Lincoln
(1077-20-856)

4:15 PM The submonoid membership problem for groups.
Markus Lohrey, Institut für Informatik, Universität Leipzig, and Benjamin Steinberg*, City College of New York
(1077-20-1462)

4:45 PM Generic properties of finitely presented groups. Preliminary report.
Robert H Gilman, Stevens Institute of Technology, Hoboken, NJ
(1077-20-1395)

5:15 PM Extreme compression and efficient computation, with application to the word problem. Preliminary report.
Will Dison, Bank of England, and Tim Riley*, Cornell
(1077-20-1682)

5:45 PM On the Dimension of Matrix Representations of Nilpotent Groups.
Maggie Habeeb* and Delaram Kahrobaei, CUNY Graduate Center
(1077-68-1207)

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

2:15 PM Short geodesics in moduli space.
Christopher J. Leininger*, University of Illinois at Urbana-Champaign, and Dan Margalit, Georgia Tech
(1077-57-1798)

2:45 PM Recurrence and unique ergodicity for Weil-Petersson geodesics and their ending laminations.
Jeffrey F. Brock, Brown University
(1077-37-2833)

3:15 PM Recognizing 3-manifold groups.
Daniel Groves, University of Illinois at Chicago, Jason Fox Manning*, University at Buffalo, and Henry Wilton, University College London
(1077-20-934)

3:45 PM L-spaces vs. left-orderability.
Liam Watson, UCLA
(1077-57-591)
AMS Special Session on Modeling of Heterogeneous Media, II

Properties, Microstructure, and Multiscale

AMS Special Session on Local Field

Properties, Microstructure, and Multiscale Modeling of Heterogeneous Media, II

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

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

2:15 PM G-convergence approach to homogenization of nonlinear difference operators.
Alexander Pankov, Morgan State University (1077-35-1203)

2:45 PM Homogenization in periodically perforated domains.
Rachad Zaki, Khalifa University of Science, Technology and Research, Abu Dhabi, UAE (1077-35-1498)

3:15 PM On a novel idea for the local characterization of solutions of multiscale elliptic problems.
Daniel T. Onofrei*, Giles Auchmuty, and Yuliya Gorb, University of Houston (1077-35-4459)

3:45 PM Bounds and optimal structures of three-material composites: Beyond the translation bound.
Andrei Cherkaev, University of Utah (1077-35-2135)

4:15 PM 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)

4:45 PM Microscopic continuum mechanics of particle systems.
Alexander Panchenko*, Washington State University, and Lyudmyla Barannyk, University of Idaho (1077-70-2090)

5:15 PM On the Characterization of the Effective Yield Set in Polycrystal Plasticity.
Marian Bocea, Loyola University Chicago (1077-49-1868)

5:45 PM 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

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

Organizer: Catherine Roberts, College of the Holy Cross

Wayne M. Getz, Berkeley, California (1077-92-2945)


3:45 PM 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)

4:15 PM 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)

4:45 PM A Discrete-Time Age-Structured Model Of Exploited Fishery Systems.
Nianpeng Li and Abdul-Aziz Yakubu*, Howard University (1077-92-1451)

5:15 PM Selecting Sites for a Fully Connected Reserve Network.
Nahid Jafari* and John Hearne, RMIT University, Melbourne, Victoria, Australia. (1077-90-735)
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.
Ellina Grigorieva*, Texas Woman’s University,
Evgenii Khalilov, Lomonosov Moscow State University, and
Andrei Korobeinikov, Limerick University, Ireland (1077-49-1354)

3:15PM
Stationary distributions of semistochastic 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
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 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 Atmospheric Vortices.
Lynn R. Greenleaf, University of Oklahoma, Norman, OK (1077-49-2047)

5:15PM
Near Optimal Selling Rule for a Mean-Reverting Asset.
Eunju Sohn* and Qing Zhang, University of Georgia (1077-49-1345)

5:45PM
Optimal control in age-dependent models in epidemiology and demography.

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
Douglas E Ward, Miami University (1077-49-485)

2:45PM
Applications of Banach Space Geometry for Optimization Problems and Variational Inequalities.
Yakov Alber, Boston, MA (1077-49-2466)

3:15PM
First and Second Order Tangent Cones and Their Applications in Set Constrained Optimization.
Elena Constantino, University of Pittsburgh-Johnstown (1077-90-179)

3:45PM
Conical Regularization for Abstract 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 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 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 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 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
AMS Special Session on Stability Analysis for Infinite Dimensional Hamiltonian Systems, II

2:15 PM – 5:35 PM

2:15 PM

Radiative decay of bubble oscillations in a compressible fluid.

Michael I. Weinstein, Columbia University (1077-76-2796)

2:45 PM

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)

3:15 PM

Solitons on manifolds.

Jeremy L Marzuola, University of North Carolina, Chapel Hill (1077-35-337)

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

2:15 PM – 5:05 PM

2:15 PM

Global existence for water wave equations.

Pierre M Germain, Courant Institute, New York University (1077-35-506)

4:15 PM

Unstable manifolds and L^2 nonlinear instability of Euler equations.

Zhiwu Lin and Chongchun Zeng*, Georgia Institute of Technology (1077-35-941)

4:45 PM

Enstrophy growth in the viscous Burgers equation.

Dmitry Pelinovsky, McMaster University (1077-35-279)

5:15 PM

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

2:15 PM

Renormalization, Lie algebras and infinite divisibility. Preliminary report.

Luigi Accardi, Centro V. Volterra, Università di Roma Tor Vergata (1077-00-2304)

3:15 PM

MRM triples associated with Brenke type generating functions. Preliminary report.

Nobuhiro Asai, Aichi University of Education (1077-35-990)

3:45 PM

 Recovering a Function from the Gauss Radon Transform in White Noise Analysis.

Jeremy J Becnel, Stephen F. Austin State University (1077-46-1090)

4:15 PM

 Smooth Measures and Stochastic Analysis in Abstract Wiener Space.

Fariborz Asadian, Fort Valley State University (1077-60-695)

4:45 PM


Yuh-Jia Lee, National University of Kaphsiung (1077-60-808)

5:15 PM

 Unitorizing measure for the representation of a Lie group.

Habib Ouerdiane, University of Tunis El Manar, Tunisia (1077-60-2407)

5:45 PM

Free noise stochastics and geometry.

Ambar Niel Sengupta, Louisiana State University (1077-60-1332)
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
Jennifer M. Wilson, Harvey Mudd College

Francis Edward Su, Harvey Mudd College (1077-05-1487)

2:45PM 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 (1077-05-1489)

3:15PM 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 Klamer, University of Graz (Austria) (1077-91-1261)

3:45PM A Simple Bargaining Mechanism That Elicits Truthful Reservation Prices.
Todd R. Kaplan, University of Haifa, and D. Marc Kilgour*, Wilfrid Laurier University (1077-91-1182)

4:15PM 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 (1077-91-1342)

4:45PM Two-Step Coalition Values for Multichoice Games.
Michael A. Jones, Mathematical Reviews, and Jennifer Wilson*, Eugene Lang College of the New School for Liberal Arts (1077-91-1398)

5:15PM 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)
Redistricting: from theory to practice. Preliminary report.
Karen Saxe, Macalester College (1077-91-1830)

MAA Minicourse #3: Part A
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

MAA Minicourse #7: Part A
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

AMS Minicourse #11: Part A
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

AMS Session on Combinatorics and Graph Theory, II
2:15 PM – 5:25 PM Room 111, Hynes

AMS Session on Finite Differences and Functional Equations: Sequences, Series, and Expansion
2:15 PM – 5:25 PM Room 308, Hynes

Signed-graphic representations of matroids.
Vaidy Sivaraman, The Ohio State University (1077-05-2653)

Covering length-n permutations with n+1.
Kathryn M Hawley*, Harvey Mudd College, and Taylor Allison, North Carolina State University (1077-05-2608)

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

Relation between the energy of a digraph and the energy of its underlying graph. Preliminary report.
Nafiseh Jahanbakht*, New York, NY, and Kourosh Tavakoli, City University of New York (1077-05-2629)

On 2 – 1 Graph Achievement Games.
Curtis Clark, Morehouse College (1077-05-2587)

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

Consecutive Matches in Permutations and cycle structures of permutations.
Miles Eli Jones* and Jeffrey Remmel, University of California, San Diego (1077-05-2650)

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

Descent pattern avoidance.
Richard Ehrenborg and JiYoon Jung*, University of Kentucky (1077-05-2487)
AMS Session on General Topology

2:15 PM – 4:10 PM Room 305, Hynes

2:15 PM (488) Correspondences between ideals and \( z \)-filters for rings of continuous functions between \( C^0 \) and \( C \).
Joshua Sack and Saleem Watson*, California State University Long Beach (1077-54-2745)

2:30 PM (489) Amalgamating Factor Spaces of Generalized Inverse Limits.
Scott M. Varagona, Auburn University (1077-54-2702)

2:45 PM (490) Numerability in sets, spaces and covers.
Preliminary report.
Nigar Tuncer Ozarslan, Istanbul (1077-54-2315)

3:00 PM (491) A \( P \) - and \( C^*(D) \)-filters process of compactifications and any Hausdorff compactification.
Huayetzin J. Wu*, Texas A & M University – Kingsville, and Wan-Hong Wu, University of Texas at San Antonio (1077-54-440)

3:15 PM (492) Knots in the canonical book
Preliminary report.
Dana P. Rowland* and Andrea Politano, Merrimack College (1077-54-1393)

AMS Session on Mathematical Biology and Related Fields, II

2:15 PM – 5:40 PM Room 105, Hynes

2:15 PM (496) Results on a discrete, age-class population model. Preliminary report.
David Chan* and Hye Jin Ban, Virginia Commonwealth University (1077-92-2316)

David K Hammond*, NeuroInformatics Center / University of Oregon, and Benoit Scherrer, Computational Radiology Laboratory / Children’s Hospital / Harvard University (1077-92-2142)

2:45 PM (498) Toward a Vaccine: Modeling the Immune Response Against Shigella.
Courtney L Davis, University of Maryland, College Park (1077-92-1848)

3:00 PM (499) Phenotype Sequencing.
Marc Allen Harper, UCLA (1077-92-1807)

Azmy S. Ackleh, University of Louisiana at Lafayette, and Jeremy J. Thibodeaux*, Loyola University New Orleans (1077-92-1680)

Anna Mummert, Marshall University (1077-92-2697)
AMS Session on Mechanics and Mathematical Physics, II

2:15 PM – 5:40 PM

Room 303, Hynes

2:15 PM

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)

2:30 PM

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)

4:00 PM

Break.

4:15 PM

Biodiversity dynamics under intransitive competition and habitat destruction. Preliminary report.

Matthew J Labrum, Washington State University (1077-92-1606)

4:30 PM

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)

4:45 PM

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)

5:00 PM


Eric J. Kostelich, Arizona State University (1077-92-2640)

5:15 PM


Wondimu W. Teka*, Joel Tabak, Florida State University, Theodore Vo, Martin Wechselberger, University of Sydney, and Richard Bertram, Florida State University (1077-92-1489)

5:30 PM

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)

2:15 PM

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)
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<td>2:15 PM</td>
<td>AMS Session on Probability Theory, Stochastic Processes, and Statistics, II</td>
<td>Room 209, Hynes</td>
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<tr>
<td>2:30PM</td>
<td>Primitive Recursive Representations of “Skorokhod Sequences” for the Standard Normal.</td>
<td>Marina Skiers, Lehigh University (1077-60-1748)</td>
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<tr>
<td>2:45PM</td>
<td>On Spectral Properties of Certain Large Matrices That Arise in the Study of Processor Shared Queues.</td>
<td>Qiang Zhen*, University of North Florida, and Charles Knessl, University of Illinois at Chicago (1077-60-1484)</td>
</tr>
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<td>3:00PM</td>
<td>Effects of cell division on stochastic intracellular chemical reaction systems.</td>
<td>John K McSweeney* and Lea Popovic, Concordia University (1077-60-1191)</td>
</tr>
<tr>
<td>3:30PM</td>
<td>Target Shooting and Normal Distribution.</td>
<td>Preliminary report.</td>
</tr>
<tr>
<td>3:45PM</td>
<td>Forecasting Foreign Exchange rates with Simultaneous Nearest Neighbor Algorithm using Mahalanobis Distance as the Distance Measure.</td>
<td>Vindya Kumari Pathirana* and Kandethody M Ramachandran, University of South Florida (1077-60-2072)</td>
</tr>
<tr>
<td>4:00PM</td>
<td>Rate of Convergence of Weak Euler Approximation for Nondegenerate Itô Diffusion and Jump Processes.</td>
<td>C. Y. Zhang, Xi’an Jiaotong-Liverpool University (1077-60-595)</td>
</tr>
<tr>
<td>4:15PM</td>
<td>Percolation threshold bounds derived by the substitution method without a reference lattice.</td>
<td>Preliminary report.</td>
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<tr>
<td>2:15PM</td>
<td>AMS Session on Undergraduate Research, II</td>
<td>Room 110, Hynes</td>
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<tr>
<td>2:30PM</td>
<td>Extremal Graphs Without 4-Cycles.</td>
<td>Frank A. Firke*, Carleton College, Evan D. Nash, University of Nebraska-Lincoln, and Peter M. Kosek, The College at Brockport, SUNY (1077-05-2136)</td>
</tr>
<tr>
<td>2:45PM</td>
<td>The Abelian Sandpile Model.</td>
<td>J K Herring*, E Meza and C M Nieuwoudt, Sam Houston State University (1077-05-2920)</td>
</tr>
<tr>
<td>3:00PM</td>
<td>A Family of Algorithms Yielding a Solution to the Hermite Problem.</td>
<td>Preliminary report.</td>
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</tbody>
</table>
2:15 PM – 5:30 PM  Back Bay Ballroom C, 2nd Floor, Sheraton
Organizers: M. E. Waggoner, Simpson College; Therese Shelton, Southwestern University

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)

2:15 PM  The n-House Problem.
Amanda Kovacs, Molloy College (1077-11-2743)

2:30 PM  Fraction of Nonnegative Polynomials that are Sums of Squares.
Caitlin A Lownes, Massachusetts Institute of Technology (1077-14-312)

4:35 PM  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-DS-1357)

4:35 PM  The Power of Symbolic Spreadsheets.
Rejoice Mudzimiri, Montana State University (1077-DS-2589)

5:15 PM  Visualizing Lagrange Multiplier Optimization using CalcPlot3D.
Paul E Seeburger, Monroe Community College (1077-DS-1952)

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

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

2:15 PM  Becoming One with Bifurcations in 3D!
Itai Seggev, Wolfram Research, Inc. (1077-DS-787)


Phil Gustafson, Colorado Mesa University (1077-DS-2604)

3:15 PM  Communicating calculus concepts using graphically presented functions in Adobe Flash applets embedded in WeBWork.
Daniel J Gries, Hopkins School (1077-DS-2616)

J Alfredo Jimenez, Penn State Hazleton (1077-DS-2453)

3:55 PM  Taking Instruction with Numerical Computations to the Next Octave.
Talitha M Washington, Howard University (1077-DS-1554)

Susan L Schmoyer, Worcester State University (1077-DS-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

2:15 PM  Discovery learning in linear algebra using dynamical geometry software.
Martha Ellen Waggoner, Simpson College (1077-F1-1720)

2:35 PM  Using Dynamic Geometry Software to Foster Students' Understanding of Vectors.
Tanya Berezovski, St. Joseph's University, Philadelphia, and Tyler Gasich*, St. Josephs' University, Philadelphia (1077-F1-872)

2:55 PM  Teaching geometry using linear algebra. Preliminary report.
Dragu Atanasiu*, University of Boras, Sweden, and Piotr Mikusinski, University of Central Florida (1077-F1-828)

Stephen Hilbert, Ithaca College, Ithaca (1077-F1-2689)

3:35 PM  Group Theory in the Linear Algebra Classroom. Preliminary report.
Paul E. Becker* and Mark Medwid, Penn State Erie, The Behrend College (1077-F1-1698)

3:55 PM  A Physical Laboratory for Linear Algebra.
Jeffrey M Hokanson*, Steven J Cox and Mark Embree, Rice University (1077-F1-2686)

4:15 PM  Discrete Dynamical Fibonacci.
Edward Early, St. Edward's University (1077-F1-711)
### Program of the Sessions – Boston, MA, Wednesday, January 4 (cont’d.)

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<th>Time</th>
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<td>2:15 PM</td>
<td><strong>MAA Session on Mathematics and Sports, II</strong></td>
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<td>2:15 PM</td>
<td><strong>Combinatorial Scheduling: a way to motivate matrix multiplication and other important concepts.</strong></td>
<td>Donna A. Dietz, University of Pennsylvania (1077-F1-274)</td>
</tr>
<tr>
<td>4:15 PM</td>
<td><strong>Rule of Tangent for Win-By-Two Games.</strong></td>
<td>Reza D Noubary, Bloomsburg University (1077-G1-2571)</td>
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<tr>
<td>2:35 PM</td>
<td><strong>Hot Hands on the PGA Tour.</strong></td>
<td>Roland Minton, Roanoke College (1077-G1-2364)</td>
</tr>
<tr>
<td>2:45 PM</td>
<td><strong>A Hypothetical Learning Trajectory for Conceptualizing Matrices as Linear Transformations.</strong></td>
<td>Megan Wawro*, Virginia Tech, and Christine Larson, Vanderbilt University (1077-F1-2328)</td>
</tr>
<tr>
<td>2:55 PM</td>
<td><strong>A Logistic Regression Analysis of the NFL Overtime.</strong></td>
<td>Nicholas Gorgievski*, Nichols College, and Thomas C. DeFranco, University of Connecticut (1077-G1-2844)</td>
</tr>
<tr>
<td>3:15 PM</td>
<td><strong>The Quarterback Passer Rating: Analyzing and Tweaking the QBPR.</strong></td>
<td>Paul von Dohlen, William Paterson University (1077-G1-2098)</td>
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<td>3:35 PM</td>
<td><strong>An Adjustment to the Colley Matrix Method.</strong></td>
<td>Mike Weimerskirch, Augsburg College (1077-G1-1091)</td>
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<td>3:55 PM</td>
<td><strong>Paradoxes in Colley Matrix Sports Rankings.</strong></td>
<td>T. S. Michael, U. S. Naval Academy (1077-G1-2049)</td>
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<tr>
<td>4:15 PM</td>
<td><strong>Using Sports Ranking in a Numerical Linear Algebra Course.</strong></td>
<td>Chuck Wessell, Gettysburg College (1077-G1-2685)</td>
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<tr>
<td>4:35 PM</td>
<td><strong>Modeling a Baseball Defense as a Network.</strong></td>
<td>Tina Hartley, United States Military Academy (1077-G1-2508)</td>
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<td>4:45 PM</td>
<td><strong>A Century of Baseball Statistics.</strong></td>
<td>Alan Levine, Franklin and Marshall College (1077-G1-1361)</td>
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<tr>
<td>5:15 PM</td>
<td><strong>Pythagorean Prognostication.</strong></td>
<td>Yousuf George, Nazareth College (1077-G1-2858)</td>
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### MAA Session on Touch It, Feel It, Learn It: Tactile learning Activities in the Undergraduate Mathematics Classroom, II

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<td>2:15 PM</td>
<td><strong>Using Models to Help Students Understand Calculus Topics.</strong></td>
<td>Sharon L Crumpton, Belmont University; Nashville, TN (1077-O1-373)</td>
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<tr>
<td>2:35 PM</td>
<td><strong>Using 3-D Manipulatives to Teach Calculus.</strong></td>
<td>Benjamin J Thirey* and Robert D Wooster, West Point (1077-O1-2810)</td>
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<tr>
<td>3:15 PM</td>
<td><strong>Raising Calculus to the Surface.</strong></td>
<td>Deanna S. Stiggins, Middle Tennessee State University (1077-O1-2842)</td>
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<td>3:35 PM</td>
<td><strong>The Chain Rule Dance.</strong></td>
<td>Mariah Birgen, Wartburg College (1077-O1-1033)</td>
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<td>4:15 PM</td>
<td><strong>Getting the &quot;feel&quot; for centers of mass.</strong></td>
<td>James A Sellers, Penn State University (1077-O1-2847)</td>
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<td>4:35 PM</td>
<td><strong>Curve Sketching with Puzzle Pieces.</strong></td>
<td>Teena Carroll, St. Norbert College (1077-O1-2847)</td>
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<td>4:55 PM</td>
<td><strong>Grocery Bags and Lasers.</strong></td>
<td>Randall E Cone, Virginia Military Institute (1077-O1-1578)</td>
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<td>5:15 PM</td>
<td><strong>A Connection Between Cross Country Scoring and Election Tallying.</strong></td>
<td>Jacob Erb, Taylor University (1077-G1-2837)</td>
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<tr>
<td>5:35 PM</td>
<td><strong>Grocery Bags and Lasers.</strong></td>
<td>Brian A. Macdonald, United States Military Academy (1077-G1-2930)</td>
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<tr>
<td>5:45 PM</td>
<td><strong>An introduction to quantitative analysis in hockey.</strong></td>
<td>Ben D. Trost, Virginia Polytechnic Institute (1077-O1-2837)</td>
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<td>5:55 PM</td>
<td><strong>A Hypothetical Learning Trajectory for Conceptualizing Matrices as Linear Transformations.</strong></td>
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### Resources
- [Program of the Sessions – Boston, MA, Wednesday, January 4](#)
- [MAA Session on Touch It, Feel It, Learn It: Tactile learning Activities in the Undergraduate Mathematics Classroom, II](#)
### MAA Session on the Capstone Course: Innovations and Implementations, II

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<td><strong>Organizers:</strong> Kathryn Weld, Manhattan College</td>
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<td></td>
<td>Agnes Rash, St. Joseph’s College</td>
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<td>2:15 PM</td>
<td>Communication, Problem Solving and Independence in a Capstone Course.</td>
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<td>Kristin A Camenga, Houghton College</td>
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<td>(593)</td>
<td>[594]</td>
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<td>2:55 PM</td>
<td>Optimizing Capstone With Multiple Constraints.</td>
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<td>(596)</td>
<td>Risto Atanasov*, Tuval Fuguel and Jeffery Lawson, Western Carolina</td>
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<td>University (1077-C1-280)</td>
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<td>2:55 PM</td>
<td><strong>A Vertically Integrated Model for a Mathematics “Capstone”.</strong></td>
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<td>(597)</td>
<td>Aaron Luttman*, Joseph Skufca, Clarkson University, Brian Leventhal,</td>
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<td>University of Pittsburgh, and Clarice Dziak, Clarkson University</td>
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<td>3:15 PM</td>
<td>Surveying U.S. Mathematics Teacher Preparation Programs: What is the</td>
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<td>(598)</td>
<td>status of the capstone course? Preliminary report.</td>
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<td>Dana C. Cox, Miami University, and Mary Beisiegel*, Harvard University</td>
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<td>(1077-C1-770)</td>
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<td>(599)</td>
<td>Jeremy Case, Taylor University (1077-C1-2823)</td>
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<td>3:55 PM</td>
<td>Fostering Communication Skills and Independence in a Capstone Project.</td>
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<tr>
<td>(600)</td>
<td>Preliminary report.</td>
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<td>Karrolyne Fogel* and Chris Brown, California Lutheran University</td>
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<td></td>
<td>(1077-C1-2690)</td>
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<td>4:15 PM</td>
<td><strong>A formative three-semester capstone experience.</strong></td>
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<td>(601)</td>
<td>Daniel E. Otero and Joseph F. Wagner*, Xavier University (1077-C1-1121)</td>
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<td>4:35 PM</td>
<td><strong>Senior Seminar, Across a Department and Across the Years.</strong></td>
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<td>(602)</td>
<td>Preliminary report.</td>
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<td>Meredith I. Greer* and Chip Ross, Bates College (1077-C1-151)</td>
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<tr>
<td>4:55 PM</td>
<td><strong>Online Discussion Boards in Seminar:</strong> Discovering exciting tidbits</td>
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<td>(603)</td>
<td>missed inside the classroom walls on the outside.</td>
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<td>Daniel R. Shiflet, Clarion University of Pennsylvania (1077-C1-2592)</td>
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<td>5:15 PM</td>
<td><strong>Starting a capstone experience: A user’s guide.</strong></td>
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<tr>
<td>(604)</td>
<td>Preliminary report.</td>
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<tr>
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<td>Kurt Herzinger*, Beth Schaubroek and Dale Peterson, United States Air</td>
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<td>Force Academy (1077-C1-2449)</td>
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Implementing Mathematics Research Experiences into Teacher Preparation Programs.

A First Attempt at Categorizing and Assessing Different Levels of Student Understanding. Preliminary report.
Paula Shorter* and Mairead Greene, Rockhurst University (1077-N1-2747)

Using Inquiry Based Learning to Enhance Student Attitudes in Complex Analysis. Preliminary report.
Edwin P Herman, University of Wisconsin-Stevens Point (1077-N1-2740)

Does “Thinking about Thinking” Impact Completion Rates of Pre-class Data? Preliminary report.
Mindy Capaldi, Illinois Central College (1077-N1-47)

Collaborative peer review between two IBL number theory courses.
Dana C. Ernst*, Plymouth State University, Angela Hodge, University of Nebraska of Omaha, and Andrew Schultz, Wellesley College (1077-N1-1154)

A Semi-IBL Finite Mathematics Course: Is it possible and can it be successful? Preliminary report.
Mindy Capaldi, Valparaiso University (1077-N1-1032)

An analysis of the effectiveness of using exclusively workshop-style instruction in the College Algebra classroom. Preliminary report.
Jennifer Vandenbussche*, Christina Scherrrer, Alexandra Brigham and Anastasiasia Semenova, Southern Polytechnic State University (1077-N1-793)

A cross-disciplinary analysis of math students’ writing. Preliminary report.
Patrick Bahls*, University of North Carolina, Asheville, Amy Mecklenburg-Faenger, Marguerite Scott-Copes and Chris Warnick, College of Charleston (1077-N1-47)

Pedagogy in large lectures and the age of digital media: Keep up or be left out! Fabiana Cardetti* and Amit Savkar, University of Connecticut (1077-N1-2051)

Aliza Steurer, Dominican University

Math Days for Women.
Violeta Vasilievska*, Utah Valley University, and Clare Wagner, University of South Dakota (1077-VA-2892)

Investigating Gender Differences in UMTYMP Entrance Exam.
Justin Edward Sukiennik, University of Minnesota (1077-VA-2538)

Strategies to Help Underrepresented and First Generation Students in the STEM Fields.


ABACUS International Math Challenge.
Tivadar Diveki, Grace Church School, and Zsuzsanna Szaniszlo*, Valparaiso University (1077-VA-2540)

Closing the loop!
Noureen Khan, University of North Texas at Dallas (1077-VA-314)

Increasing Math Proficiency in High School Teaching.
Bradley Forrest, Pamela Kosick* and Chia-Lin Wu, Richard Stockton College of New Jersey (1077-VA-452)

Another approach to Pre-service Teachers’ preparation programs.
Ali S Shaqlaih, University of North Texas at Dallas (1077-VA-2551)

Teacher Created Multiple-Choice Assessments and the Use of Assessment Data for Planning Instruction.
Sue Brown, University of Houston-Clear Lake (1077-VA-462)

Mathematics Parterning with Computer Science to Improve Calculus Instruction and Investigate Student Learning Difficulties.
Marilyn Reba, Calvin Williams, Roy Pargas, Allen Guest and Ellen Breazel*, Clemson University (1077-VA-2134)

What Calculus do students learn after Calculus? Preliminary report.
Todd Moore, Kansas State University (1077-VA-1977)

An effort to coordinate conceptual development in math and physics education for engineering undergraduate students. Preliminary report.
Gregory R Baker, The Ohio State University (1077-VA-1881)

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)

CONNECT Math: A Partnership in Higher Education. Rebecca C. Metcalf, Bridgewater State University (1077-VA-691)

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)

MAA General Contributed Paper Session: Calculus

2:15 PM – 5:40 PM

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

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)

Convergences of Catalan Series. Thomas Koshy and Zhenguang Gao*, Framingham State University (1077-VC-2178)

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)

Reverse Mathematics and the Last Proofs of Calc One. Stephen M Walk, St. Cloud State University, St. Cloud, Minnesota (1077-VC-2618)

Generalized trigonometric substitution. Robert D. Poodlack, Norwich University (1077-VC-2798)

Resequencing Calculus: An Early Multivariate Approach. Preliminary report. Mark E Gruenwald and David J Dwyer*, University of Evansville (1077-VC-1130)


Analysis of Student Achievement and Retention Regarding Online Calculus Homework. Daniel L Kern, Florida Gulf Coast University (1077-VC-2601)

Multiple Choice Versus Open Response Assessment in Calculus. Shannon R Lockard* and Irina Seceleau, Bridgewater State University (1077-VC-929)

The Big 'BUT' about Blogs in Online Calculus. Preliminary report. Denise LeGrand, University of Arkansas at Little Rock (1077-VC-529)

Time management and student success using the computer-based instructional system Aleks. Preliminary report. Steven D. Wallace, Macon State College (1077-VC-999)

A Decade of Improving Pass Rates in Mathematics using Interactive Software. Michelle DeDeo, University of North Florida (1077-VC-2620)
Program of the Sessions – Boston, MA, Wednesday, January 4 (cont’d.)

Thomas E Leathrum, Jacksonville State University (1077-2670)

3:00PM  Lurch, a free math word processor that can check your work.
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?
Eric Thorburn*, Benjamin Hung and John Jackson, United States Military Academy (1077-VI-1955)

3:30PM  Wiki Technology Supporting Learning I.
Elisabeth Thoren*, University of California, Santa Barbara, and Brian Katz, Augustana College (1077-VI-1622)

3:45PM  Wiki Technology Supporting Learning II.
Brian Katz*, Augustana College, and Elisabeth Thoren, University of California, Santa Barbara (1077-VI-1620)

4:00PM  Increasing Student Engagement in Undergraduate Mathematics with Tablet PCs.
Carla A Romney*, Juan Pedro Paniagua and Fabian Torres-Ardila, Boston University (1077-VI-164)

4:15PM  Teaching mathematics online, is it even possible?
Aldo R. Maldonado, Park University (1077-VI-2725)

4:30PM  Perspectives on the Use of Dynamic Mathematical Software in Classrooms.
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.
Daniel Kiteck, Indiana Wesleyan University (1077-VI-1652)

5:00PM  Neuro Mathematics Education and Technology.
Alexander Y Vaninsky, City University of New York, Hostos Community College (1077-VI-756)

5:15PM  A Nomograph For The Trigonometric Functions.
Timothy Hall, PQI Consulting (1077-VI-273)

MAA-AMS Invited Paper Session on the Philosophy of Mathematics

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

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

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

Joel Spencer, Courant Institute (1077-05-832)

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

Sven Leyffer* and Ashutosh Mahajan, Argonne National Laboratory (1077-90-2357)

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

AMS-MAA Joint Panel Discussion

2:15PM – 3:35PM  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

Jill Zarestky, Texas A&M University

YMN/Project NExT Poster Session
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
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
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
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
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
3:45 PM – 4:15 PM
Room 208, Hynes

MAA Panel Discussion
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
4:00 PM – 5:00 PM
Salon E, 4th Floor, Marriott
Chair: Rick Gillman, Valparaiso University

Reception for Undergraduate Students
4:00 PM – 5:00 PM
Ballroom C, 3rd floor, Hynes
AMS Committee on the Profession Panel Discussion
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
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
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
5:30 PM – 7:30 PM Room 304, Hynes
5:30 PM Reception and business meeting.
6:30 PM Heron, Newton, Euler, and Barnev.
William Dunham, Muhlenberg College (1077-A0-2560)

Reception for Graduate Students and First-Time Participants
5:30 PM – 6:30 PM Salon FG, 4th Floor, Marriott

AMS Josiah Willard Gibbs Lecture
8:30 PM – 9:30 PM Ballrooms A/B, 3rd floor, Hynes
A 250-year argument: Belief, behavior, and the bootstrap.
Bradley Efron, Stanford University (1077-62-13)

Thursday, January 5

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

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

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

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

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

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

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

10:30 AM
Cambridge mathematics in the north: Peter Guthrie Tait, Philip Kelland and the local nature of mathematics in Edinburgh, 1858-1865.
Josipa Petrunic, Institute for the History and Philosophy of Science and Technology, University of Toronto (1077-01-1532)
AMS-SIAM Special Session on the Mathematics of Computation: Differential Equations, Linear Algebra, and Applications, II

8:00 AM – 11:50 AM Room 109, Hynes

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

8:00AM (678) A balanced finite element method for singularly perturbed reaction-diffusion problems.
Runchang Lin*, Texas A&M International University, and Martin Stynes, National University of Ireland (1077-65-635)

Susanne C. Brenner, Li-yeng Sung, Hongchao Zhang and Yi Zhang*, Louisiana State University (1077-65-1754)

9:00AM (680) Finite dimensional approximations of nonlocal diffusion and peridynamic models.
Qiang Du, Penn State University (1077-65-2140)

Andrew T. Barker*, Susanne C. Brenner and Li-Yeng Sung, Louisiana State University (1077-65-1579)

10:00AM (682) HDG Methods for the Vorticity-Pressure Formulation of the Stokes Problem.
Bernardo Cockburn and Jintao Cui*, University of Minnesota (1077-65-528)

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

8:00 AM – 11:50 AM Room 104, Hynes

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

8:00AM (692) Stationary Navier-Stokes equations with singular external forces.
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  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  Exponential Operator Splitting for the
generalized Kawahara equation.
Pablo U Suarez, Delaware State
University (1077-35-183)

9:30AM  Dispersion estimates for Schrödinger
operators in dimension two with
obstructions at zero energy.
M Burak Erdoğan, University of Illinois at
Urbana-Champaign, and William R
Green*, Eastern Illinois University
(1077-35-64)

10:00AM  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  A proof of a Theorem of Boutet de
Monvel. Preliminary report.
Matthew B. Stenzel, Ohio State
University at Newark (1077-58-1928)

11:00AM  Unimodular Fourier Multipliers On
Modulation Spaces. Preliminary report.
Jiecheng Chen, Zhejiang University,
P.R.China, Dahan Fan and Lijing Sun*,
University of Wisconsin-Milwaukee
(1077-35-526)

11:30AM  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 Combinatorial
Geometry of Polytopes, I

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

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

9:00AM  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  Parameter estimation for energy balance
models with memory. Preliminary report.
Mickael D. Chekroun*, Department of
Atmospheric & Oceanic Sciences
and IGPP, UCLA, Lionel Roques,
University Aix-Marseille (1077-35-2575)

10:00AM  Uncertainty quantification in the
simulation of quasi-one-dimensional
nozzle flow. Preliminary report.
Yanyan He*, Youssuf Hussaini and
Jonghoo Bin, Florida State University
(1077-60-2126)

10:30AM  Correcting flow estimates in Chesapeake
Bay using data assimilation.
Matthew J Hoffman, Rochester Institute
of Technology (1077-86-2741)

11:00AM  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 Climate Modeling
and Geophysical Fluid Dynamics, I

8:00 AM – 11:50 AM  Room 102, Hynes

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

8:00AM  Semiregular Polytopes and Amalgamated
C-Groups. Preliminary report.
Egon Schulte, Northeastern University
(1077-05-801)

8:30AM  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  Theory and examples of ghost symmetry.
David Richter, Western Michigan
University (1077-51-544)

9:30AM  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  Constructing self-Petrie and self-dual
covers of regular polyhedra.
Gabe Cunningham, Northeastern
University (1077-52-814)
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

8:00 AM  Oscillatory solutions of fourth order conservative systems via the Conley index.
         Miroslav Kramar*, Rutgers, Vandenberg and R. Van der Vorst, Free University Amsterdam (1077-55-1002)

8:30 AM  Computing Well Diagrams for Vector Fields in $\mathbb{R}^n$.
         Primoz Skraba, Jozef Stefan Institute (1077-68-2114)

9:00 AM  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)

9:30 AM  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)

9:30 AM  A discussion.

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

8:00 AM  Automorphisms of Hurwitz series.
         William F. Keigher*, Rutgers University, Newark Campus, and V. Ravi Srinivasan, Catholic University of America (1077-13-1231)

8:30 AM  Cohomology of Differential Schemes.
         Raymond T. Hoobler, City College of New York and Graduate Center, CUNY (1077-14-511)

9:00 AM  Classification of Algebraic Subgroups of Lower Order Unipotent Algebraic Groups.
         V. Ravi Srinivasan, Catholic University of America (1077-12-530)

9:30 AM  Higher variationnal equations between Kolchin solvability and virtual Abelianness.
         Guillaume Duval, INSA de Rouen (France) (1077-20-394)

10:00 AM  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)

10:30 AM  Solvability of difference Riccati equations.
          Seiji Nishioka, Aoyama Gakuin University (1077-12-299)

11:00 AM  Galois theory of strongly normal differential and difference extensions.
          Michael Wibmer, RWTH Aachen (1077-12-600)

11:30 AM  The ring of global sections of a differential scheme.
          Dmitry Trushin, Hebrew University of Jerusalem (1077-12-596)

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

8:00 AM – 11:50 AM  Room 200, Hynes

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

8:00 AM  Persistent homology and statistical inference. Preliminary report.
         Peter Bubenik, Cleveland State University (1077-55-2042)

8:30 AM  Evasion Paths in Mobile Sensor Networks. Preliminary report.
         Henry Adams, Stanford University (1077-55-1678)

9:00 AM  Obstruction-Theoretic Sensing. Preliminary report.
         Justin Michael Curry, University of Pennsylvania (1077-55-1709)

9:30 AM  Computing Well Diagrams for Vector Fields in $\mathbb{R}^n$.
         Primoz Skraba, Jozef Stefan Institute (1077-68-2114)

10:00 AM  Persistance homology and statistical inference. Preliminary report.
          Rafael Komendarczyk and Jeffrey Pullen*, Tulane University (1077-57-985)

10:30 AM  Solvability of difference Riccati equations.
          Seiji Nishioka, Aoyama Gakuin University (1077-12-299)

11:00 AM  Galois theory of strongly normal differential and difference extensions.
          Michael Wibmer, RWTH Aachen (1077-12-600)

11:30 AM  The ring of global sections of a differential scheme.
          Dmitry Trushin, Hebrew University of Jerusalem (1077-12-596)
Program of the Sessions – Boston, MA, Thursday, January 5 (cont’d.)

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

8:00 AM  (736) A More Efficient Approach to Bayesian Variable Selection.
         Eric R Ruggieri*, Duquesne University (1077-62-1198)

9:00 AM  (738) Some Observations Involving the Baumslag groups G(m, n).
         Anthony E Clement, Brooklyn College, City University of New York
         (1077-20-1297)

9:30 AM  (739) From indexed languages to generating functions.
         Jared Adams, Eric M Freden*, Southern Utah University, and Marni Mishna,
         Simon Fraser University (1077-05-864)

10:00 AM  (740) Abelian extensions of orthogonal Lie algebras in E_6 and E_8.
          Andrew Douglas*, Delaram Kahrobaei, City University of New York,
          and Joe Repka, University of Toronto (1077-17-1454)

          Zoran Sunic, Texas A&M University (1077-20-2767)

11:00 AM  (742) Permutational isomorphism of permutation groups.
          László Babai, The University of Chicago, Paolo Codenotti*, IMA, University
          of Minnesota, and Youming Qiao, Tsinghua University (1077-68-1334)

11:30 AM  (743) Quantum Algorithms for Fixed Points and Invariant Subgroups.
          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 Futer, Temple University
            Genevieve Walsh, Tufts University

8:00 AM  (744) How do you build examples?
         David Ben McReynolds, Purdue University (1077-20-1826)

8:30 AM  (745) Hyperbolicity and measure in Teichmüller space.
         Spencer Dowdall, UIUC, Moon Duchin*, Tufts University, and Howard Masur,
         University of Chicago (1077-51-1685)

9:00 AM  (746) Dynamics of non-classical interval exchanges.
         Vaibhav Gadre, Harvard University (1077-51-933)

9:30 AM  (747) On convex and non-convex Fuchsian polyhedral realizations of hyperbolic surfaces with a single conical singularity.
         Jaejeong Lee, Seoul, South Korea, and Kei Nakamura*, Temple University
         (1077-57-2910)

10:00 AM  (748) Hyperbolic directions in Teichmüller space equipped with the Lipschitz metric.
          Jing Tao, University of Utah (1077-51-1007)
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

8:00 AM Virtual Knot Theory - State Sum Invariants. Preliminary report.
Louis H Kauffman, University of Illinois at Chicago (1077-57-699)

8:30 AM Virtual knots and Khovanov Homology.
Heather A Dye*, McKendree University, Louis Kauffman, University of Illinois at Chicago, and Aaron Kaestner, North Park University (1077-57-508)

9:00 AM A new generalization of the Khovanov Homology. Preliminary report.
Ik Jae Lee, Kansas State University (1077-18-114)

9:30 AM Strong L-Spaces and Left Orderability.
Adam Simon Levine*, Brandeis University, and Sam Lewallen, Princeton University (1077-57-1801)

10:00 AM A relationship between categorified braid invariants from representation theory and Floer theory. Preliminary report.
Denis Auroux, University of California, Berkeley, J. Eliesenda Grigsby*, Boston College, and Stephan M. Wehrli, Syracuse University (1077-57-1882)

10:30 AM A new filtration of the Magnus kernel of the Torelli group.
R. Taylor McNeill, Rice University (1077-57-1343)

11:00 AM Embeddings of contact solid tori and Legendrian cable knots.
Douglas J LaFountain*, Aarhus University, John B Etnyre and Bülent Tosun, Georgia Institute of Technology (1077-57-749)

11:30 AM Unstable Vassiliev theory.
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

8:00 AM The environmental impact on sustainable forest management. Preliminary report.
Natali Hritonenko*, Prairie View A&M University, Yuri Yatsenko, HBV, and Renan Goetz, University of Girona (1077-92-608)

8:30 AM Optimally Fragmenting Graphs Against Stochastically-located Threats: Balancing Preventative and Real-time Actions in Wildfire Containment.
Gwen Spencer* and David Shmoys, Cornell University (1077-90-1978)

9:00 AM Effect of Gravity in Diffusive Thermal Instabilities of Diffusion Flames.
Joseph E Hibdon, Jr*, Northeastern Illinois University, and Moshe Matalon, University of Illinois at Urbana-Champaign (1077-76-1864)

9:30 AM Multiscale methods for seismic imaging.
Susan E. Minkoff, University of Maryland Baltimore County (1077-86-2488)

10:00 AM A Bayesian Model Identifying Locations At Risk From Human-Transported Exotic Pathogens.
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)

10:30 AM Temporally variable dispersal and demographic can accelerate the spread of invading species.
Stephen P. Ellner, Cornell University, and Sebastian J. Schreiber*, University of California, Davis (1077-92-1571)

11:00 AM Mathematical modeling for the improvement of sustainable pest management: a trap cropping example.
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)

11:30 AM To eradicate or not to eradicate: Economic optima for spatial immunizing infections.
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

10:00 AM The prime geodesic theorem.
Jonathan Kish, University of Colorado at Boulder (1077-57-98)

10:30 AM Simons, 3rd Floor, Marriott

Organizer: Catherine Roberts, College of the Holy Cross

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11:30 AM To eradicate or not to eradicate: Economic optima for spatial immunizing infections.
Petra Klepac, Princeton University (1077-92-1871)
8:00 AM – 11:50 AM Clarendon, British Columbia/Simon Fraser University

A Weighted Selberg Sieve. Preliminary report.

C S Franz, Central Michigan University (1077-11-2445)

On the maximum number of consecutive integers on which a character is constant.

Enrique Trevino, Swarthmore (1077-11-1736)

The distribution of character sums.

Jonathan W Bober*, University of Washington, and Leo Goldmakher, University of Toronto (1077-11-2214)

On the divisors of $x^n - 1$.

Lola Thompson, Dartmouth College (1077-11-2093)

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

Paul Pollack, University of British Columbia/Simon Fraser University

Youness Lamzouri*, University of Illinois at Urbana-Champaign, and Leo Goldmakher, University of Toronto (1077-11-1742)

When is a multiplicative function small on average?

Dimitris Koukoulopoulos, CRM, Universite de Montreal (1077-11-2166)

The latest pretensions. Preliminary report.

Andrew Granville, University of Montreal (1077-11-1619)

9:00 AM 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)


Steven A Bleiler*, Portland State University, and Thomas R Fielden, Portland, Oregon (1077-60-1105)

10:00 AM Optimal Control of Variational Inequalities.

Janos Turi* and Alain Bensoussan, University of Texas at Dallas (1077-49-936)

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)

11:00 AM Optimal R & D Spending and Competition Between Firms. Preliminary report.

Jannett Highfill and Michael McAsey*, Bradley University (1077-49-365)

11:30 AM 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

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)

Free Biholomorphic Functions and Operator Model Theory.

Gelu F Popescu, University of Texas at San Antonio (1077-47-509)

Some Applications of Non-Commutative Functions in Free Analysis.

Mihai Popa, Queen’s University (1077-46-1791)

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 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

8:00 AM (787) The rational points on a recalcitrant genus 12 curve.
Ralph Greenberg, University of Washington, Karl Rubin, UCI, Michael Stoll, Universität Bayreuth, and Alice Silverberg*, University of California, Irvine (1077-11-777)

8:30 AM (788) Twists of Shimura Curves.
James Henry Stankewicz, University of Georgia (1077-11-1155)

9:00 AM (789) A descent map for curves with totally degenerate semi-stable reduction.
Shahed Sharif, CSU San Marcos (1077-11-1592)

9:30 AM (790) Siegel's Theorem and the Shafarevich Conjecture. Preliminary report.
Aaron Levin, Michigan State University (1077-11-1753)

10:00 AM (791) Hilbert's Tenth Problem for function fields of positive characteristic.
Kirsten Eisentraeger, The Pennsylvania State University (1077-11-1200)

10:30 AM (792) Integral points on elliptic curves and explicit valuations of division polynomials.
Katherine E Stange, Stanford University (1077-11-1233)

11:00 AM (793) The Distribution of 2-Selmer Ranks of Quadratic Twists of Elliptic Curves.
Zev Klagsbrun, University of Wisconsin - Madison (1077-11-1268)

11:30 AM (794) Elliptic division and unramified correspondence.
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

8:00 AM (795) Energy/Lyapunov Function Method for Solving Stochastic Differential Equations.
Gangaram S. Ladde, University of South Florida at Tampa (1077-34-1092)

8:30 AM (796) Qualitative Analysis of Stochastic Theta Methods for SDEs.
Henri Schurz, Southern Illinois University (1077-60-1065)

9:00 AM (797) Stochastic Differential Equations of the Wick Type. Preliminary report.
Fariborz Asadian, Fort Valley State University (1077-60-915)

Janusz S Golec, Fordham University (1077-60-1003)

10:00 AM (799) Hybrid Impulsive Control of Stochastic Systems with Multiplicative Noise under Markovian Switching.
S. Sathananthan, N. Jordan Jameson* and M. J. Knap, Tennessee State University (1077-93-325)

10:30 AM (800) Pathwise Convergence Rate for Numerical Solutions of Stochastic Differential Equations.
Son Luu Nguyen*, Carleton University, and George Yin, Wayne State University (1077-60-1797)

11:00 AM (801) Asymptotic Properties of Consensus-Type Algorithms for Networked Systems with Regime-Switching Topologies.
G. Yin, Yu Sun* and Le Yi Wang, Wayne State University (1077-60-330)

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
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00 AM</td>
<td>Open problems in real projective structures on low-dimensional orbifolds.</td>
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<td><strong>Suhyoung Choi</strong>, KAIST (1077-57-970)</td>
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<tr>
<td>9:00 AM</td>
<td>On Embedded Spheres of Closed Affine Manifolds. Preliminary report.</td>
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<td><strong>Weiqiang Wu</strong>, University of Maryland - College Park (1077-51-408)</td>
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<td>9:30 AM</td>
<td>Bi-Lipschitz Extension from Boundaries of Certain Gromov Hypabolic Spaces.</td>
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<td><strong>Anton Lukyanenko</strong>, University of Illinois Urbana-Champaign (1077-51-371)</td>
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<tr>
<td>10:00 AM</td>
<td>Two-holed cross surfaces and their affine deformations.</td>
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<td><strong>Todd A. Drumm</strong>, Howard University, <strong>Virginie Charette</strong>, University of Sherbrooke, and <strong>William M. Goldman</strong>, University of Maryland, College Park (1077-51-1456)</td>
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<tr>
<td>11:00 AM</td>
<td>The Simple $S^n$-branched Cover Area of a Surface. Preliminary report.</td>
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<td><strong>Aldo-Hilario Cruz-Cota</strong> and <strong>Teresita Ramirez-Rosas</strong>, Grand Valley State University (1077-57-309)</td>
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<tr>
<td>11:30 AM</td>
<td>Volumes of Complex Hyperbolic Orbifolds.</td>
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<td><strong>Ilesanmi Adeboye</strong>, Wesleyan University (1077-57-621)</td>
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<td>9:00 AM</td>
<td>Identification of Nerves in Ultrasound Scans Using a Modified Mumford-Shah Functional and Prior Information.</td>
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<td><strong>Jung-Ha An</strong>, California State University, Stanislaus, <strong>Paul Biegelisen</strong>, Department of Anesthesiology/University of Maryland, and <strong>Steven Damelin</strong>, Georgia Southern University (1077-49-1645)</td>
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**AMS Session on Calculus of Variations, Optimal Control, and Optimization**

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<thead>
<tr>
<th>Time</th>
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<tr>
<td>8:00 AM</td>
<td>Optimal Control of Projectile Motion with Sensitivity-Based Optimization.</td>
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<td><strong>David C. Sumerley</strong>, Francis Marion University (1077-49-2448)</td>
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<tr>
<td>8:15 AM</td>
<td>A Comparison of Derivative-Free Optimization Methods with Constraint Methods.</td>
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<td><strong>Ahmad R Almomeni</strong> and <strong>Katie R. Fowler</strong>, Clarkson University (1077-49-1734)</td>
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<tr>
<td>8:30 AM</td>
<td>Existence of isoperimetric regions in $R^n$ with density.</td>
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<td><strong>Frank Morgan</strong>, Williams College, and <strong>Aldo Pratelli</strong>, Universita di Pavia (1077-49-224)</td>
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<tr>
<td>8:45 AM</td>
<td>Solution of optimal control problems via combined block-pulse functions and polynomial series.</td>
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<td><strong>Mohsen Razzaghi</strong>, Mississippi State University (1077-49-634)</td>
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<td>9:00 AM</td>
<td>Geometric Applications of the Maximum Principle.</td>
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<td><strong>Mostafa Ghandehari</strong>, University of Texas at Arlington (1077-49-180)</td>
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<td>9:15 AM</td>
<td>A variational characterization of the effective yield set for ionic polycrystals.</td>
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<td><strong>Farhod Abdullayev</strong>, North Dakota State University (1077-49-1034)</td>
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**AMS Session on Combinatorics and Graph Theory, III**

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00 AM</td>
<td>On the Permanent Rank of Matrices.</td>
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<td><strong>Keivan Hassan Monfared</strong>, Graduate Student / University of Wyoming (1077-05-2314)</td>
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<tr>
<td>8:15 AM</td>
<td>Zero Forcing Numbers and Graph Powers.</td>
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<td><strong>Carolyn Kim</strong>, Harvard University (1077-05-2793)</td>
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<td>8:30 AM</td>
<td>Weak Discrepancy of Grids. Preliminary report.</td>
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<td><strong>Katherine V. Johnson</strong> and <strong>A. J. Radcliffe</strong>, University of Nebraska-Lincoln (1077-05-2425)</td>
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<td>8:45 AM</td>
<td>Spectral properties of complex unit gain graphs.</td>
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<td><strong>Nathan H Reff</strong>, Binghamton University (1077-05-2387)</td>
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<td>9:00 AM</td>
<td>Fair Duels, Bad Shots, and Thue-Morse.</td>
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<td><strong>Joshua N Cooper</strong> and <strong>Aaron M Dutle</strong>, University of South Carolina (1077-05-2473)</td>
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<td><strong>Filip Moric</strong> and <strong>David Pritchard</strong>, EPFL (1077-05-2386)</td>
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<tr>
<td>9:30 AM</td>
<td>Break.</td>
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<tr>
<td>9:45 AM</td>
<td>Some Results on Permutation Patterns.</td>
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<td>Preliminary report.</td>
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<td><strong>Taylor F Allison</strong>, North Carolina State University (1077-05-2372)</td>
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<tr>
<td>10:00 AM</td>
<td>Maximizing the number of edges in optimal $k$-rankings.</td>
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<tr>
<td></td>
<td>Preliminary report.</td>
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<td><strong>Kathleen M. Ryan</strong> and <strong>Garth Isaak</strong>, Lehigh University (1077-05-2351)</td>
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<tr>
<td>10:15 AM</td>
<td>Degree Matrices of $k$-edge Colored Graphs.</td>
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<tr>
<td></td>
<td><strong>Kathleen M. Ryan</strong> and <strong>Garth Isaak</strong>, Lehigh University (1077-05-2351)</td>
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<tr>
<td>10:30 AM</td>
<td>Generating Differential Equations for Multi-restricted Stirling numbers.</td>
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<td>Preliminary report.</td>
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<td><strong>Ji Young Choi</strong>, Shippensburg University of PA (1077-05-2348)</td>
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<tr>
<td>10:45 AM</td>
<td>The negative $q$-Binomial.</td>
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<td></td>
<td><strong>Shishuo Fu</strong>, KAIST, Republic of Korea, <strong>Victor Reiner</strong>, <strong>Dennis Stanton</strong>, University of Minnesota, and <strong>Nathaniel Thiem</strong>, University of Colorado at Boulder (1077-05-2310)</td>
</tr>
</tbody>
</table>
AMS Session on Geometry and Differential Geometry, I

8:00 AM – 9:40 AM Room 105, Hynes

8:00 AM Large autopetism groups on translation planes. Preliminary report.
Oscar Vega*, California State University, Fresno, N. L. Johnson, University of Iowa, and Vikram Jha, Glasgow United Kingdom. (1077-51-1591)

8:15 AM A note on a topological geometrical interpretation of Bell’s inequality and Hardy’s quantum entanglement.
S. I. Nada*, University of Qatar, and El-naschie, Alexandria university, Egypt (1077-51-1211)

John Arden Hiigli, Le Jardin a l’Ouest (1077-51-1162)

8:45 AM The Chen-type of some isoparametric hypersurfaces in the unit sphere.
Ivko M Dimitric, Pennsylvania State University Fayette, The Eberly Campus (1077-53-2899)

9:00 AM Complete geometry on a Riemannian $\mathbb{A}$-module. Sylvester’s theorem.
Adaee Christiana Anyaegbunam, University of Port Harcourt, Nigeria (1077-51-65)

9:15 AM Tiling a triangle with congruent triangles.
Michael Beeson, San Jose State University (1077-51-488)

9:30 AM Differential forms on contact quotients.
Fatima Mahmood, Cornell University (1077-51-2485)

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

8:00 AM – 10:40 AM Room 305, Hynes

8:00 AM Paths in the pants complex and bridge splittings of knots.
Alexander M Zupan, University of Iowa (1077-57-2952)

8:15 AM The sl(3) skein module.
Jeffrey Boerner, Westminster College (1077-57-2806)

8:30 AM The asymptotic expansion of a Witten-Roshetikhin-Turzov invariants.
Benjamin Himpele and Jorgen Ellegaard Andersen, Aarhus University, Denmark (1077-53-2374)

8:45 AM Knots in handlebodies with handlebody surgeries.
R. Sean Bowman, University of Texas, Austin (1077-57-2123)

9:00 AM Squarepegs and Inscribed Polygons.
Preliminary report.
Jason Cantarella, University of Georgia, Athens, Elizabeth Denne*, Smith College, and John McCleary, Vassar College (1077-57-1536)

Stacy L. Hoehn, The University of Texas at Austin (1077-57-2235)

9:45 AM Algebras Counting Minimal Intersection and Self-Intersection Numbers of Loops on a Surface.
Patricia Cahn, Dartmouth College (1077-57-2121)

10:00 AM The adjoint action on homotopy-associative $H$-spaces.
Nicholas D. Nguyen, University of California San Diego (1077-57-1401)

10:15 AM Circle Valued Generating Families and Legendrian Link Invariants.
Christopher A Mickewright, Bryn Mawr College (1077-57-860)

10:30 AM On the rotation class of knotted and Self-Intersection Numbers of Loops in $\mathbb{R}^3$.
Preliminary report.
Ben McCarty* and Scott Baldridge, Louisiana State University (1077-57-760)

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

8:00 AM – 10:40 AM Room 209, Hynes

8:00 AM Beta-cauchy distribution and its applications. Preliminary report.
Eraf Alshawarbeh*, Felix Famoye and Carl Lee, Central Michigan University (1077-62-1436)

8:15 AM Invariant Theory for Hypothesis Testing on Graphs.
Andrey Rukhin, Naval Surface Warfare Center Dahlgren Division (1077-62-428)

8:30 AM Investigation of a Random Graph Model for Neuronal Connectivity.
David J. Marchette*, Naval Surface Warfare Center, Dahlgren, VA, Carey E. Pribe, Johns Hopkins University, Rebecca F. Goldin and Giorgio A. Ascoli, George Mason University (1077-62-424)
AMS Session on Undergraduate Research, III


9:15AM 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 On a hybrid method for variable selection. Daniel Vasiliiu, Christopher Newport University (1077-62-2870)

9:45AM 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 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)


10:30AM 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 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 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 An Analytical Approach to Solving Green Oxidation Processes. Diego Torrejon, George Mason University (1077-34-1156)

9:00AM Tear-film dehydration of a soft contact lens. Preliminary report. Mihail Sharov, George Mason University (1077-35-1888)


9:45AM Break.

10:00AM 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 Nable 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)


10:45AM 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)

AMS Session on Undergraduate Research, III

8:00 AM - 11:25 AM Room 110, Hynes

8:00AM 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 Shepard, University of Notre Dame (1077-15-118)
11:00 AM  
**MAA Session on Arts and Mathematics, Together Again, II**

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

**8:00 AM**  
**Fourier Transform helps relaxation.**

**Ricardo V Teixeira**, University of Houston - Victoria (1077-B1-207)

**8:20 AM**  
**Semigroups, L-Systems, and Algorithmic Composition.** Preliminary report.

**Marcus Pendergrass**, Hampden-Sydney College (1077-B1-2954)

**8:40 AM**  
**On the geometry of music.** Preliminary report.

**Benjamin Himpe1**, Aarhus University, Denmark (1077-B1-2365)

**9:00 AM**  
**Exploring the Mathematics of Tuning a Musical Instrument using Straws.**

**Christine von Renesse**, Westfield State University, MA (1077-B1-698)

**9:20 AM**  
**Composing with Mathematics: Final Projects in a Math and Music Course.**

**Gareth E Roberts**, College of the Holy Cross (1077-B1-2572)

**9:40 AM**  
**Three stories from the math-art frontier.** Preliminary report.

**Luke Wolcott**, University of Washington (1077-B1-894)

**10:00 AM**  
**Math/Art: Collaborative Practices.**

**William Kronholm**, Whittier College, and **Aaron Bocanegra**, SCI-Arc (1077-B1-559)

**10:20 AM**  
**Creative Variations.**

**Jennifer Wilson**, Eugene Lang College The New School for Liberal Arts (1077-B1-2825)

**10:40 AM**  
**Fostering Artistic Explorations with Geometer’s Sketchpad.**

**Debra L. Hydorn**, University of Mary Washington (1077-B1-2486)

**11:00 AM**  
**Improv Techniques for the Mathematics Classroom.** Preliminary report.

**Andrea N Young**, Ripon College (1077-B1-229)

**11:20 AM**  
**Mathematics in Literature and Cinema.** Preliminary report.

**Mark Kozek**, Whittier College (1077-B1-2296)

**11:40 AM**  
**Artists Respond to the Enigma of Alan Turing.**


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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

**8:00 AM**  
**Reduction of the operation cost via optimal control of an industrial wastewater biotreatment process.**

**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)

**8:20 AM**  
**Tires, Insurance and Clutches:**

**Applications of Undergraduate Consulting.** Preliminary report.

**John R Ramsay**, The College of Wooster (1077-G5-2780)

**8:40 AM**  
**Visualizing semantic data through the use of partially ordered sets.** Preliminary report.

**Emilie Hogan** and **Cliff Joslyn**, Pacific Northwest National Laboratory (1077-G5-2674)

**9:00 AM**  
**Cubic Splines, Local Extrema, and the Harmonic Mean: An Application to Graph Editors.**

**James H. Fife**, Educational Testing Service (1077-G5-324)

**9:20 AM**  
**Optimization in Fourier imaging for laser remote sensing.**

**Thomas Höft**, Tufts University (1077-G5-1922)

**9:40 AM**  
**Modeling GPS Interference.**

**Joseph J. Rushanan**, The MITRE Corporation (1077-G5-2112)

**10:00 AM**  
**Using Regression to Determine Cost Estimating Relationships for Costing of FAA Software.**

**William S. Barfield**, QuanTech Services, Inc. (1077-G5-2293)

**10:20 AM**  
**New Metrics to Detect Suicide Bombers.**

**William P. Fox**, Naval Postgraduate School, Monterey, CA (1077-G5-520)

**10:40 AM**  
**Math in the City.**

**Ananthnarayan Hariharan** and **Lauren Keough**, University of Nebraska - Lincoln (1077-G5-775)

**11:00 AM**  
“Careers in Mathematics” speakers series.

**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, 2nd Floor, Sheraton
Organizers: Jacqueline Jensen, Slippery Rock University
Deanna Haunsberger, Carleton College
Karen Marrongelle, Portland State University
8:00 AM Math Club Bingo.
4. (893) Jacqueline A. Jensen-Vallin, Slippery Rock University (1077-J5-658)
8:20 AM The Calculus Bowl: A Fundraising Activity for the Mathematics Club.
4. (894) H. Smith Risser, Casey Clark*, Jay Rosencrantz, JoAnne McAllister, Jeff Winter and Stuart Fortier, Montana Tech (1077-J5-2111)
8:40 AM The Amazing Mathematical Race.
4. (895) Brooke E Buckley* and Bethany A Noblitt, Northern Kentucky University (1077-J5-755)
9:00 AM Bringing Down The House?
4. (896) Kathryn Behrend Andrist, Utah Valley University (1077-J5-1099)
4. (897) Jill Bigley Dunham* and Ann Stewart, Hood College (1077-J5-2030)
9:40 AM Origami for Math Clubs.
4. (898) Dale K Hathaway, Olivet Nazarene University (1077-J5-1386)
10:00 AM Celebrating Pi-Day with a Piathlon!
4. (899) Daniel M. Look, St. Lawrence University (1077-J5-732)
10:20 AM University of Rochester’s Annual Pi-Day Festival.
4. (900) Alicia M Cornelia, University of Rochester (1077-J5-1723)
10:40 AM Interdisciplinary Lecture Series.
4. (901) Jennifer McCloud-Mann* and Christina Graves, The University of Texas at Tyler (1077-J5-1397)
11:00 AM Art Museum Field Trip.
4. (902) Kathi Crow, Salem State University (1077-J5-2043)
11:20 AM Beautiful Minds: Getting hooked on Math through Literature.
4. (903) Maria Falidas, American Community Schools of Athens (1077-J5-2267)
11:40 AM Math Awareness Week: Students
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
8:00 AM Students’ Understanding of Two-Variable Functions and Rates of Change.
Eric David Weber, Arizona State University (1077-M1-33)
8:20 AM A circle of radius one: Pre-service teachers’ notions of the unit circle.
4. (906) Kevin C. Moore*, Kevin R. LaForest and Hee Jung Kim, University of Georgia (1077-M1-142)
8:40 AM Introducing the Concept of Derivative via the Calculus Triangle.
9:00 AM The Proof is in the Practice? Graduate Teaching Assistants and Future Teachers.
4. (908) Kimberly Cervello Rogers, Michigan State University (1077-M1-796)
9:20 AM To Prove or Disprove: How Do Undergraduate Students Decide?
4. Preliminary report.
Kelly M. Bubp, Ohio University (1077-M1-805)
9:40 AM Authority dynamics in mathematics discussions. Preliminary report.
4. Rebecca A. Dibbs, David M. Glassmeyer* and Michael C. Oehrtman, University of Northern Colorado (1077-M1-922)
10:00 AM Building Symbolic Meaning Through Dynamically-Connected Representations in Abstract Algebra.
4. (913) James T Sandefur*, Georgetown University, John Mason, Gabriel J. Stylianides and Anne Watson, Oxford University (1077-M1-1714)
11:00 AM A Model of Students’ Combinatorial Thinking.
4. 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 Mikhailov, U.S. Military Academy
Julie Barnes, Western Carolina University
8:00AM – 11:55 AM Room 201, Hynes

MAA General Contributed Paper Session: Research in Analysis

8:00 AM – 11:55 AM Room 201, Hynes

8:00AM (915) Riding the Ferris Wheel: A Sinusoidal Model.
Kathleen Cage Mittag*, The University of Texas at San Antonio, and Sharon Taylor, Georgia Southern University (1077-O1-1351)

8:20AM (916) Building Art Galleries for Geometric Proofs.
B. Carrigan, Auburn University (1077-O1-1420)

8:40AM (917) Learning Through Re-Arrangement of Patterns.
John C Mayer* and William O Bond, University of Alabama at Birmingham (1077-O1-2442)

9:00AM (918) Geometric Models in Many Classrooms.
Teresa E. Moore*, Ithaca College, and L. Christine Kinsey, Canisius College (1077-O1-2553)

9:20AM (919) Building Mathematics Understanding with Toys.
Mike Long, Shippensburg University (1077-O1-2554)

9:40AM (920) Investigating Polytopes of the Fourth Dimension by Building Models.
John F Putz, Alma College (1077-O1-1426)

10:00AM (921) Tearing Plastic: A laboratory exercise on fractals and hyperbolic geometry.
Ron Taylor* and Todd Timberlake, Berry College (1077-O1-2597)

10:20AM (922) Traffic Jam: Teaching Critical Thinking through Games.
Melissa A Stoner, Salisbury University (1077-O1-1689)

Julie F Rogers, Auburn University (1077-O1-2343)

11:00AM (924) Hands-On SET©.
Ellizabeth McMahon*, Lafayette College, and Rebecca Gordon, Queen Margaret College, Wellington NZ (1077-O1-2843)

8:30AM (927) Looking for a few good means.
Bruce R. Ebanks, Mississippi State University (1077-VJ-1335)

8:45AM (928) a CLT for independent non-identical processes.
Yuping Yang, Texas A&M University (1077-VJ-2869)

9:00AM (929) Benford’s Law and Dependent Random Variables.
Thealex Becker*, Smith College, Alec Greaves-Tunnell, Williams College, Ryan Ronan, Cooper Union, and Steven J Miller, Williams College (1077-VJ-2495)

9:15AM (930) The Necessary Condition For $\phi$-equation in Hölder space in $\mathbb{C}^d$.
Young Hwan You, Indiana University East (1077-VJ-2578)

Joshua P. Bowman, Stony Brook University (1077-VJ-1360)

9:45AM (932) Existence of Solutions for Nonconvex $n^{th}$ Order Differential Inclusions.
Michael Fullerton and Kristi Karber*, University of Central Oklahoma (1077-VJ-1077)

10:00AM (933) Bifurcations of Inverse Functions: A Story of Undergraduate Research.
Jody M Sorensen, Augsburg University (1077-VJ-2559)

10:15AM (934) Proof of the density hypothesis.
Yuanyou F. Cheng, Waltham, MA (1077-VJ-949)

10:30AM (935) On quasi-diagonality of continuous fields.
Jose L. Lugo, Purdue University (1077-VJ-1706)

10:45AM (936) How Fast does a Sequence of Positive Integers Grow? An Elementary Perspective based on Multiplication.
Michael A Brilleslyper* and Bradley A Warner, U. S. Air Force Academy, Colorado Springs, CO (1077-VJ-845)

11:00AM (937) A tail of two series. Preliminary report.
Johann A Thiel, United States Military Academy (1077-VJ-2564)

11:15AM (938) Low-lying zeros of cuspidal Maass forms.
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 (939) Quantitative Approximation by Fractional Smooth General Singular Operators.
George A Anastassiou, University of Memphis, and Razvan A. Mezei*, Lander University (1077-VJ-450)

Daniel Joseph Galiffa, Penn State Erie, The Behrend College (1077-VJ-2638)
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

8:00 AM (941) Estimation of eigenvalues and their multiplicities of a covariance operator.
Krishna Kapli*, Illinois Wesleyan University, Frits H. Ruymgaart and George Gaines, Texas Tech University (1077-VE-2346)

8:15 AM (942) Linear Tests of Uniformity for Data Defined on Distance Transitive Graphs.
Premilinary report.
Connor Ahlbach, John Choi, Michael Orrison, Harvey Mudd College, Laura Passarelli, Scripps College, and Shujing Xu*, Claremont Graduate University (1077-VE-2286)

8:30 AM (943) Approximation to the Generalized Gamma Distribution.
Salam Md. Mahbubush Khan, Alabama A&M University (1077-VE-2009)

8:45 AM (944) Detection of slightly expressed changes in random environment.
Veera Holdai, Salisbury University (1077-VE-1317)

9:00 AM (945) Prediction on Random Fields with Maximum Entropy Models.
Priya Kohli* and Mohsen Pourahmadi, Texas A&M University (1077-VE-1117)

9:15 AM (946) Bounded influence nonlinear signed-rank regression.
Huybrechts Bindele* and Asheber Abebe, Auburn University (1077-VE-954)

9:30 AM (947) Rank-based estimation for generalized linear models.
Guy-vanie M Miakonkana* and Asheber Abebe, Auburn University (1077-VE-478)

9:45 AM (948) A Robust Dispersion Estimator and its Applications.
Jianfeng Zhang*, Chattanooga TN, David Olive, Southern Illinois University Carbondale, and Ping Ye, Quincy University (1077-VE-293)

10:00 AM (949) Exact Confidence Intervals for the Ratio of Two Proportions.
Pual R. Coe, Dominican University (1077-VE-2753)

10:15 AM (950) Using Linear Mixed-Effects Models to Examine Correlates of stress, anxiety, depression to find the factors affecting psychosocial attributes.
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)

10:30 AM (951) Using Mixed Distributions to Model Count Data with Application.
Mehdi Razzaghi, Bloomsburg University (1077-VE-2947)

10:45 AM (952) Life Expectancy Estimate with Bivariate Weibull Distribution using Archimedean Copula.
Seung-Hwan Lee*, Illinois Wesleyan University, and Eun-Joo Lee, Millikin University (1077-VE-951)

11:00 AM (953) Census at School: An Outreach Program to Teach Statistical Problem Solving in Grades 4-12 Using Real Student Data.
Rebecca Nichols, American Statistical Association (1077-VE-2627)

11:15 AM (954) Teaching Statistics through the years:
What works? What doesn’t? What’s next?
Barbara A. Wainwright, Salisbury University (1077-VE-1422)

11:30 AM (955) Introducing The Idea of Fitting a Distribution to Data in a Probability Course. Preliminary report.
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

8:00 AM (956) Computing interesting topological features on surface embedded graphs.
Erin Chambers, Saint Louis University (1077-68-2460)

8:30 AM (957) Optimal stochastic planarization.
Anastasios Sidiropoulos, Toyota Technological Institute at Chicago (1077-68-1790)

9:00 AM (958) An Introduction to Davenport-Schinzel Sequences, Forbidden 0-1 Matrices, and Their Geometric Applications.
Seth Pettie, University of Michigan (1077-05-2046)

9:30 AM (959) Toward understanding complex data: graph Laplacians on singular manifolds.
Mikhail Belkin, Qichao Que, Yusu Wang*, The Ohio State University, and Xuanyuan Zhou, University of Chicago (1077-68-1943)

10:00 AM (960) Horoball Hulls and Extents in Positive Definite Space.
P. Thomas Fletcher, John Moeller, Jeff M Phillips and Suresh Venkatasubramanian*, University of Utah (1077-51-2840)

10:30 AM (961) Computational Geometry on Uncertain Data.
Jeff M Phillips, University of Utah (1077-51-2277)

11:00 AM (962) Geometric Aspects of Compressive Sensing.
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  (963) On the bunkbed conjecture and related problems.
Svante Linusson, KTH, Stockholm, Sweden. (1077-05-2062)

9:00AM  (964) Monotone Hurwitz numbers and the HCIZ integral.
Jonathan Novak, Massachusetts Institute of Technology (1077-05-1569)

9:30AM  (965) The Potts model on random lattices.
Olivier Bernardi, MIT (1077-05-1438)

10:00AM  (966) Enumerations deciding the weak Lefschetz property.
David W. Cook II and Uwe Nagel, University of Kentucky (1077-05-545)

10:30AM  (967) Lifted generalized permutahedra and composition polynomials. Preliminary report.
Federico Ardila*, San Francisco State University, and Jeffrey Doker, University of California, Berkeley (1077-05-2311)

11:00AM  (968) Flow polytopes and the Kostant partition function for signed graphs.
Alejandro H. Morales**, MIT, and Karola Mészáros, University of Michigan (1077-05-1965)

11:30AM  (969) Algebra based on real hyperplane arrangements.
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  (970) Concentration compactness and KdV-NLS solitary waves.
John P Albert* and Santosh Bhattarai, University of Oklahoma (1077-35-2704)

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

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

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

Josef F Dorfmeister, Technische Universität München, and Ivan C Sterling*, St. Mary’s College of Maryland (1077-53-2863)

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

11:30AM  (976) Global Well Posedness for a system of KdV-type Equations with Coupled Quadratic nonlinearities.
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  (977) Global Stability Results for Relativistic Fluids in Expanding Spacetimes.
Jared Speck, Massachusetts Institute of Technology (1077-35-736)

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

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

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

10:30AM  (981) Stability analysis via Backlund transform in completely integrable PDE.
Aaron Hoffman, Franklin W. Olin College of Engineering (1077-35-1784)
11:00AM  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

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  Web 2.0 for Linear Algebra Classes.
Tom Edgar, Pacific Lutheran University (1077-F1-2712)

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

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

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

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

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

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

11:00AM  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 Loz, 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  A Comparison of Different Pedagogical Approaches to Linear Algebra.
Sukanya Basu, Grand Valley State University (1077-F1-1242)

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

MAA Invited Address

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

9:00 AM – 11:45 AM  Room 302, Hynes
Organizers:  Thomas Koshy, Framingham State University
Shannon Lockard, Bridgewater State University

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

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

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

11:15AM  \[1 + 2 + 3 + 4 + \cdots\].
Frank H Thorne, University of South Carolina (1077-AC-857)

MAA Minicourse #4: Part A

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

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

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

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

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

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>9:00AM</td>
<td>Making connections with Precalculus.</td>
<td>Ramanjit K Sahi, Austin Peay State University (1077-K5-903)</td>
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<tr>
<td>9:20AM</td>
<td>Tangent lines: a multifaceted concept.</td>
<td>Peter J. Byers, Boston University (1077-K5-2801)</td>
</tr>
<tr>
<td>9:40AM</td>
<td>Preparing students for proofs and deeper conceptual thinking by implementing collaborative learning projects in Intermediate Algebra and Trigonometry.</td>
<td>Alla Morgulis* and Claire Wyn Wladis, BMCC/CUNY (1077-K5-2684)</td>
</tr>
<tr>
<td>10:00AM</td>
<td>Mathematical Reasoning in Calculus: Moving Between Representations.</td>
<td>Mairead Greene* and Paula Shorter, Rockhurst University (1077-K5-2721)</td>
</tr>
<tr>
<td>11:00AM</td>
<td>Preparing your calculus students: An inquiry-based algebra review.</td>
<td>Angie Hodge, University of Nebraska at Omaha (1077-K5-1565)</td>
</tr>
</tbody>
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## 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 Luttman, 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

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

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

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

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<tr>
<th>Time</th>
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<tr>
<td>9:20AM</td>
<td>Deviation from the Norms – Algebra, Trigonometry, &amp; Calculus for the Aspiring Life Scientist.</td>
<td>Mike Martin, Johnson County Community College (1077-P1-352)</td>
</tr>
<tr>
<td>9:40AM</td>
<td>So, why do you require Calculus?</td>
<td>Carrie Diaz Eaton, Unity College (1077-P1-728)</td>
</tr>
</tbody>
</table>
10:00AM  Undergraduate Research Projects in Mathematical Biology: Modeling and Simulation in MATLAB.
Timothy D Comar, Benedictine University (1077-P1-561)

Matthew Glomski, Marist College (1077-P1-1288)

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.
Timothy A Lucas, Pepperdine University (1077-P1-2145)

11:20AM  Cross Disciplinary Research by Undergraduates in Mathematics and Biology to Examine Cellular Processes.
Sepideh Khavari, Tara Sansom, Bradley Slabe, Jonathan Caguiat 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.
Christopher C. Leary, SUNY Geneseo (1077-P1-2482)

Exhibits and Book Sales
9:30 AM – 5:30 PM Exhibit Hall D, Hynes

AWM Emmy Noether Lecture
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
10:30 AM – NOON Room 208, Hynes
A conversation on nonacademic employment.

SIGMAA Officers Meeting
10:30 AM – NOON Room 308, Hynes
Chair: Amy Shell-Gelasch, Beloit College

MAA Panel Discussion
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
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
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
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
AMS Colloquium Lectures: Lecture II

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

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

Yibao Xu*, Borough of Manhattan Community College, CUNY, and
Wann-Sheng Horng, National Taiwan Normal University (1077-01-418)

1:30PM  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  Elevating the ranking of American mathematics departments 1900-1940.
David E Zitarelli, Temple University (1077-01-1276)

Alma Steingart, MIT (1077-01-1562)

3:00PM  On Pre Robinsonian Non-Standard Theories of the Twentieth-Century. Preliminary report.
Emil Sargsyan, Indiana University (1077-01-2898)

3:30PM  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 300, Hynes

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

1:00PM  Alan Turing and Voice Encryption.
Craig Bauer, NSA Scholar-in-Residence (1077-01-433)

2:00PM  Turing’s work and Hilbert’s Tenth Problem.
Kirsten Eisentraeger, The Pennsylvania State University (1077-11-1202)

2:30PM  Quantum Money From Knots.
Peter W. Shor, Massachusetts Institute of Technology (1077-68-2759)

3:00PM  Gödel’s theorems, Turing’s machines, and mathematical minds.
Wilfried Sieg, Carnegie Mellon University (1077-03-983)

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

**1:00 PM – 3:30 PM**  
Suffolk, 3rd Floor, Marriott

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

#### Dynamic Transition Theory for Thermohaline Circulation

Shouhong Wang, IN (1077-86-2929)

#### Dynamic Transitions and Hexagonal Patterns in Surface Tension Driven Convection

M Taylan Sengul*, Shouhong Wang, Indiana University, and Henk Dijkstra, Utrecht University (1077-76-1969)

#### Suppression of chaos at slow variables by rapidly mixing fast dynamics

Rafail V. Abramov, University of Illinois at Chicago (1077-37-2041)

#### Stochastic perturbations to dynamical systems: a response theory approach

Valerio Lucarini, Klimacampus, University of Hamburg (1077-24-254)

#### A Discrete Dynamical Systems Model to Study the Interaction Between Arctic Sea-Surface Temperature and Sea-Ice Cover

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 Applied Topology (Mathematics Research Communities session), II

**1:00 PM – 3:30 PM**  
Exeter, 3rd Floor, Marriott

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

#### ϕ-somap: Estimating Intrinsic Distance Using Persistent Homology

Paul Bendich*, Duke University, and Jacob Harer, North Carolina State University (1077-55-986)

#### Stratification Learning through Local Homology Transfer

Paul Bendich, Duke University, Bei Wang*, SCI Institute, University of Utah, and Sayan Mukherjee, Duke University (1077-55-2288)

#### Topological dimensionality reduction

Vin de Silva, Pomona College (1077-68-461)

#### Sheaf invariants for temporal logic

Michael Robinson, University of Pennsylvania (1077-94-225)

#### Directed sheaf homology and information

Sanjeevi Krishnan, University of Pennsylvania (1077-55-2262)
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 (1053) Optimal control of PDE population models involving resources.
Suzanne Lenhart, University of Tennessee (1077-35-926)

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

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

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

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 (1065) Stable multivariate Eulerian polynomials and generalized Stirling permutations.
J. Haglund* and M. Visontai, University of Pennsylvania (1077-05-1935)

AM 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 (1059) Recent results in arithmetic dynamics.
Michael E. Zieve, University of Michigan (1077-11-2550)
The M"obius 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 Geomathematics, I
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

 Approximation based on integral formulas for star-shaped surfaces.
Willi Freeden, Geomathematics Group, University of Kaiserslautern (1077-41-1152)

Integration and approximation on the sphere.
Ian H Sloan, University of New South Wales (1077-63-1790)

Spherical Multiscale Methods and Applications in Geomagnetic Modeling.
Christian Gerhards, TU Kaiserslautern (1077-41-2300)

Martin J. Fengler, St. Gallen, Switzerland (1077-86-1986)

AMS Special Session on Knot Theory, II
1:00 PM – 3:50 PM
Provincetown, 4th Floor, Marriott
Organizers: Tim Cochran, Rice University
Shelly Harvey, Rice University

Knot Floer homology and Murasugi sum. Preliminary report.
Matthew Hedden*, Michigan State University, and Sucharit Sarkar, Columbia University (1077-57-1793)

A categorification of the Tutte polynomial. Preliminary report.
Moshe Cohen, Bar-Ilan University, and Adam M Lowrance*, University of Iowa (1077-57-1333)

Graph Floer homology.
Shelly Harvey, Rice University, and Danielle O'Donnol*, Smith College (1077-57-1413)

AMS Special Session on Linear Algebraic Groups: Their Arithmetic, Geometry, and Representations, I
1:00 PM – 3:50 PM
Berkeley, 3rd Floor, Marriott
Organizers: R. Skip Garibaldi, Emory University
George McNinch, Tufts University

A Unified Solution to Some Linear Preserver Problems.
Hernando Bermudez*, Skip Garibaldi and Victor Larsen, Emory University (1077-20-751)

The gamma filtration on projective homogeneous varieties.
Kirill Zainoulline, University of Ottawa (1077-14-1368)

Parity Sheaves and Tilting Modules.
Daniel Juteau, Uni. de Caen/CNRS, Carl Mautner*, Harvard Univ./NSF, and Geordie Williamson, MPI Bonn (1077-22-2027)

Unipotent Classes in Disconnected Algebraic Groups.
Robert M Guralnick* and Jason Fulman, University of Southern California (1077-20-123)

Weakly commensurable \(S\)-arithmetic subgroups in simple algebraic groups of types \(B_n\) and \(C_n\).
Andrei Rapinchuk, University of Virginia (1077-11-2177)

Cohomology for Finite Groups of Lie Type.
Daniel K. Nakano, University of Georgia (1077-20-774)

AMS Special Session on Mathematics in Industry, II
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

Why you should infect your knots with links. Preliminary report.
John R. Burke, Rhode Island College (1077-57-2018)

Classification of 0-solvable links.
Taylor E Martin, Rice University (1077-57-2148)

Cosmetic crossing changes on knots.
Effie Kalfagianni, Michigan State University (1077-57-1253)
AMS Special Session on Mathematics in Natural Resource Modeling, IV

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

Organizer: Catherine Roberts, College of the Holy Cross

1:00 PM  On the Complexity of Competition.
Roland H Lamberson, Humboldt State University (1077-92-411)

1:30 PM  Co-viability modelling for the sustainable management of biodiversity.
Luc Doyen, CNRS, Paris, France (1077-93-643)

2:00 PM  The math and algorithms of mapping and valuing ecosystem services. Preliminary report.
Erik J Nelson, Department of Economics, Bowdoin College (1077-92-1152)

2:30 PM  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)

3:00 PM  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)

AMS Special Session on Rational Points on Varieties, II

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

1:00 PM  Failure of the Hasse principle on general K3 surfaces.
Brendan Hassett and Anthony Varilly-Alvarado*, Rice University (1077-11-797)

1:30 PM  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)

2:00 PM  Manin’s Conjecture and Balanced line bundles.
Sho Tanimoto, Courant Institute of Mathematical Sciences, New York University (1077-14-1139)

Wei Ho, Columbia University (1077-14-386)

3:00 PM  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)

3:30 PM  Abelian varieties with homotheties. Preliminary report.
Yuri Zarhin, Pennsylvania State University (1077-14-386)

AMS Special Session on Reaction Diffusion Equations and Applications, I

1:00 PM – 3:50 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 Steady-states for a chemotaxis system.
(1103) Marcello Lucia*, City University of New York, CSI, and Dirk Horstmann, University of Cologne (1077-35-1283)

Alternate Stable States in Ecosystems.
(1104) Sarath Sasi, Mississippi State University (1077-35-1101)

Asymptotic properties of perturbed parabolic equations.
(1105) Juraj Foldes, Vanderbilt University (1077-35-655)

1:30PM

A Nonlinear Stability Analysis of 
(1106) Bonni J Kealy and David J Wollkind, Washington State University (1077-35-55)

Analysis of classes of elliptic equations with nonlinear boundary conditions arising in combustion theory.
(1107) Eunkyung Ko, Mississippi State University (1077-35-305)

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

A Metric from a Reproducing Kernel Hilbert Space. Preliminary report.
(1109) Richard Rochberg, Washington University, St. Louis (1077-47-876)

Function algebras invariant under group actions. Preliminary report.
(1110) Alexander J. Izzo, Bowling Green State University (1077-32-415)

Schroeder’s Equation in Several Variables.
(1111) Robert A Bridges, Purdue University (1077-32-439)

On a pair of commuting isometries.
(1112) Rongwei Yang, SUNY at Albany (1077-47-572)

Rational inner functions and the Nevanlinna-Pick problem on $D^n$. Preliminary report.
(1113) David Scheinker, Drexel University (1077-32-959)

3:30PM Polynomial Hulls of Certain Compact Manifolds.
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

Stationary Solutions of Parabolic Equations in Gauss-Sobolev Space.
(1115) Pao-Liu Chow, Wayne State University (1077-60-414)

On the 2D Navier-Stokes and Euler equations: A statistical study.
(1116) Fernanda Cipriano, FCT-UNL and GFM-UL (1077-60-2101)

Ergodic control for two-dimensional stochastic Navier-Stokes equations. Preliminary report.
(1117) P. Sundar, Louisiana State University (1077-60-1431)

(1118) Hong Yin, State University of New York, Brockport (1077-60-1446)

A Stochastic Delay Model for Pricing Corporates Liabilities.
(1119) 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

The distinguishing chromatic numbers of graphs on surfaces.
(1121) Seiya Negami, Yokohama National University (1077-05-748)

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)

Vertex Transitive Infinite Median Graphs.
(1123) Wilfried Imrich, Montana University Leoben, Austria (1077-05-1894)
AMS Special Session on Trends in Representation Theory, III

1:00 PM – 3:50 PM Room 103, Hynes

Organizers: Donald King, Northeastern University
Alfred Noel, University of Massachusetts, Boston

1:00 PM On the adjoint representation of $sl_n$ and the Fibonacci numbers.
Pamela E Harris, University of Wisconsin Milwaukee (1077-00-910)

1:30 PM Weights and Combinatorics Appearing in Certain Demazure Crystals.
Julie Beier, Mercer University (1077-17-1674)

2:00 PM Krein spaces and local deformation in representation theory of super Lie groups.
Roland Knevel, Bar-Ilan-University Ramat Gan, Israel (1077-43-1232)

2:30 PM Restriction to a maximal compact subgroup in the $p$-adic case. Preliminary report.
Monica Nevins, University of Ottawa (1077-22-830)

3:00 PM 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)

3:30 PM Geometric Structure in the Representation Theory of Reductive $p$-adic Groups.
Paul Frank Baum, Penn State University (1077-22-86)

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

1:00 PM – 3:40 PM 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

1:00 PM Immersed surfaces in the modular orbifold.
Danny Calegari, California Institute of Technology, and Joel Louwsma*, The University of Oklahoma (1077-57-310)

1:30 PM 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)

2:00 PM 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)

3:00 PM Cubic Differentials and Limits of $RP^2$ Structures. Preliminary report.
John C Loftin*, Rutgers Newark, and Michael Wolf, Rice University (1077-53-1795)

MAA Invited Paper Session on Clever Counting or Beautiful Bijection?

1:00 PM – 4:20 PM Room 302, Hynes

Organizer: Jennifer Quinn, University of Washington, Tacoma

1:00 PM Counting on Students: Combinatorial Proofs with Undergraduates.
Arthur T. Benjamin, Harvey Mudd College (1077-AD-286)

1:30 PM Beautiful Bijections for Permutation Patterns.
Lara K. Pudwell, Valparaiso University (1077-AD-1760)

2:00 PM A Beautiful Bijection that Counts and Does More: The Robinson-Schensted-Knuth Correspondence.
Tom Roby, UConn/MIT (1077-AD-2904)

2:30 PM Beautiful Bijections and Clever Counting in Representations.
Georgia Benkart, University of Wisconsin-Madison (1077-AD-2139)

3:00 PM The Benefits of Bijections. Preliminary report.
Daniel M. Bressoud, Macalester College (1077-AD-238)

3:30 PM Descriptive derangements for a sum of spheres.
Bridget Eileen Tenner, DePaul University (1077-AD-1478)

4:00 PM A not-quite-bijective enumeration of domino tilings of Aztec diamonds.
James G. Propp, UMass Lowell and UC Berkeley (1077-AD-345)
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.
     Christopher M. Judge*, 47405, and Luc Hillairet, Universite de Nantes
     (1077-AL-862)

1:30PM On the distribution of simple geodesics.
     Peter Buser*, Ecole Polytechnique Federale, Lausanne, and Hugo Parlier,
     University of Fribourg, Switzerland (1077-AL-2471)

2:00PM Building Polygons from Spectral Data.
     Emily B Dryden*, Bucknell University, Victor Guillemin, MIT, and
     Rosa Sena-Dias, Instituto Superior Tecnico (1077-AL-2161)

2:30PM Isospectral noncompact surfaces.
     Pierre Albin, University of Illinois at Urbana-Champaign (1077-AL-1911)

3:00PM A nodal domain count mystery.
     Gregory Berkolaiko, Peter Kuchment*, Texas A&M University, and
     Uzy Smilansky, Weizmann Institute of Science and Cardiff University
     (1077-AL-988)

3:30PM Distances between Riemannian Manifolds.
     Sajjad Lakzian, CUNY GC, and Christina Sormani*, CUNY GC and Lehman College
     (1077-AL-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

AMS Session on Algebraic Geometry, I

1:00 PM – 2:55 PM Room 209, Hynes

1:00PM Variety of Finitely Generated k-algebra Homomorphisms.
     Jon Yaggie, University of Illinois Chicago (1077-14-2727)

1:15PM Cyclic Breuil modules and Hopf orders in characteristic p.
     Preliminary report.
     Alan Koch, Agnes Scott College (1077-14-2378)

1:30PM On the Secant Defectivity of Classically Studied Varieties.
     Jia Wan, University of California, Irvine (1077-14-2524)

1:45PM Realizing Cubic Hypersurfaces in P^3.
     Robert Edward Campbell, University of California, Irvine
     (1077-14-2479)

2:00PM The Arithmetic-Geometric Mean of genus 1 with Applications to genus 2 and 3.
     Preliminary report.
     Eleanor S Farrington, Massachusetts Maritime Academy (1077-14-2479)

2:15PM Stable birational equivalence and geometric Chevalley-Warning.
     Xia Liao, Florida State University (1077-14-2263)

2:30PM Maximal rank conjecture for rational curves on hypersurfaces.
     Sara Gharaehbeigi, Washington University in St Louis
     (1077-14-671)

2:45PM Dolbeault dgas and L∞-algebroids associated to subvarieties.
     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.
     Corey M Manack, Amherst College (1077-05-2264)

1:15PM Cyclic Closures of Finitely Simple Pattern Classes.
     John D Berman, Massachusetts Institute of Technology
     (1077-05-2257)

1:30PM The Smith Normal Form of the Incidence Matrix of Skew Lines in P0(3,q).
     Josh Ducey*, James Madison University, Andries Brouwer, T. U. Eindhoven,
     and Peter Sin, University of Florida (1077-05-2248)

1:45PM Random Set Systems.
     William B Jamieson, East Tennessee State University
     (1077-05-2210)
AMS Session on Manifolds, Cell Complexes, and Global Analysis, II

1:00 PM – 3:10 PM Room 305, Hynes

1:00PM    The Unknotting Number of 3-Stranded Pretzel Knots.
          Eric Staron, The University of Texas at Austin (1077-57-757)

1:15PM    The finite group actions on prism manifolds. Preliminary report.
          Ryo Ohashi, King’s College (1077-57-471)

1:30PM    Analogy between knots and primes: number fields ramified over two primes.
          Preliminary report.
          Moshe Cohen*, Bar-Ilan University (Israel), and Michael Friedman, Bar-Ilan
          University (1077-57-391)

1:45PM    Small volume link orbifolds. Preliminary report.
          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.
          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.
          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.
          Seunghun Hong, Pennsylvania State University (1077-58-2005)

2:45PM    \( MU(BG_2) \), \( CH(BG_2) \), and descent.
          Rebecca E Field, James Madison University (1077-58-2850)
AMS Session on Real and Complex Analysis

1:00 PM – 4:10 PM Room 308, Hynes

1:00PM A Pointwise Convergence and Bessel Capacity.
Javad Namazi, FDU (1077-26-649)

1:15PM Some Subclasses of the Real-Valued Honorary Baire Two Functions on \( \mathbb{R}^n \).
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.
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.
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.
Kourosh Tavakoli, City University of New York (1077-30-2312)

2:15PM Fourier multipliers and Dirac operators.
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.
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.
Stacey Muir, University of Scranton (1077-30-2765)

3:15PM On a polynomial approximation problem.
Arthur A. Danielyan, University of South Florida (1077-30-2718)

3:30PM Coefficient Estimates for Bi-univalent Ma-Minda Starlike and Convex Functions.
See Keong Lee, Universiti Sains Malaysia (1077-30-276)

Jerry R. Muir, University of Scranton (1077-32-2683)

4:00PM Multiplier sequences for simple sets of polynomials. Preliminary report.
Tamas Forgacs, California State University, Fresno (1077-30-58)

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, Tennessee-Martin (1077-55-276)

2:00PM Mean-reverting pricing models.
(1209)
Preliminary report.
Jody Trapier Shipp, George Mason University (1077-60-1206)
2:15PM  Stochastic Reduction of an SIR Model. (1210) Julia Hociota and Bruno D. Welfert, Arizona State University (1077-60-2105)
2:30PM  Break.
2:45PM  Black-Scholes Model with Markov Parameters. (1211) Mark Goldfarb and Bruno Welfert, Arizona State University (1077-60-2152)
3:00PM  The resulting weighted ranking. (1212) Dmitry Andreевич Sumkin, Moscow Institute of Physics and Technology, Moscow, Russia (1077-62-2957)
3:15PM  Modified Chambolle Method for Speckle Image Denoising. (1213) 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 Partial Likelihood Estimators Under Sampling Schemes. (1214) 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

1:00 PM - 3:35 PM  Room 311, Hynes
Organizer: Douglas E. Norton, Villanova University
1:00PM  Modular construction of knot and link patterns from simple tangles on k-uniform tessellations. (1216) David A Reimann, Albion College (1077-B1-1280)
1:40PM  Building a Better Beaded Bracelet: Transformations, Tessellations, and Tori. (1218) Susan Goldstine, St. Mary’s College of Maryland, and Ellie Baker, Lexington, MA (1077-B1-1776)
2:00PM  Using tiling theory to generate weaving patterns with beads. (1219) Gwen Laura Fisher, beAd Infinitum, California, and Blake Mellor, Loyola Marymount University, Los Angeles, California (1077-B1-633)
2:20PM  A visual representation of the decomposition of the integers into prime factors. (1220) Margaret E. Kepner, Washington, DC (1077-B1-2937)
2:40PM  The Projective Ornament of Claude Bragon. (1221) 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)

MAA Session on Projects, Demonstrations, and Activities that Engage Liberal Arts Mathematics Students, I

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 Between Liberal Arts Underclassmen and Senior Math Majors. (1225) 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 Contemporary Problem Solving. (1227) 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 projects for liberal arts mathematics. Preliminary report. (1229) Reva Kasman, Salem State University (1077-L1-560)
3:00PM  Hexiclouds: Graph Theory Meets LEGO Bricks. (1230) Edward W. Welsh, Westfield State University (1077-L1-2902)
3:20PM  Observing the Motion of the Sun and the Moon. (1231) Helmer Aslaksen, Dept. of Math./Dept. of Teacher Education, Univ. of Oslo, Norway (1077-L1-1687)
3:40PM  Survey It! Using Surveys to Answer Student’s Questions. (1232) Erin Smith, Zayed University Abu Dhabi, United Arab Emirates (1077-L1-1526)
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)

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 Mikhailov, U.S. Military Academy
Julie Barnes, Western Carolina University

1:00PM Euler Games for Differential Equations.
(1242) Rodney X. Sturdivant, United States Military Academy (1077-O1-599)
1:20PM Does the Wave Equation Really Work?
(1243) Donald C. Armstead and Michael A. Karls*, Ball State University (1077-O1-1862)
1:40PM Demonstrations That Work in the Mathematics Classroom.
Elton Graves, Rose-Hulman Institute of Technology (1077-O1-554)
2:00PM Food for (Mathematical) Thought.
(1245) Penelope H Dunham, Muhlenberg College (1077-O1-897)
2:20PM How Many Mints Do I Have?
(1246) Nathan Axvig, Virginia Military Institute (1077-O1-1767)
2:40PM The Candy-Coated Mathematics Classroom.
Erin Elizabeth Bancroft, Grove City College (1077-O1-2603)
3:00PM Origami as Hands-on Math.
(1248) Thomas C. Hull, Western New England University (1077-O1-2197)
3:20PM Cookies, Sidewalk-chalk, and Office Deletion and Equivalence Classes.
(1249) Chairs: Hands-on Activities from Calculus to Comets.
Jessica M Mikhailov, U.S. Military Academy, West Point (1077-O1-2669)
3:40PM 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 Arrowgrams.
(1251) Kenneth L Price, University of Wisconsin Oshkosh (1077-H1-426)
1:00PM – 3:40PM Room 201, Hynes

MAA General Contributed Paper Session: Modeling and Applications of Mathematics, I

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

1:00PM (1252) Solitaire mancala games as pencil puzzles. Preliminary report.
Brant Jones*, Laura Taalman and Anthony Tongen, James Madison University (1077-H1-2665)

1:15PM (1253) Quantitative Analysis of Crossword Puzzle Difficulty.
John K McSweeney, Concordia University (1077-H1-1408)

2:00PM (1254) Finding closed knight’s tours on annular chessboards. Preliminary report.
Gregory P. B. Dresden, Washington & Lee University (1077-H1-148)

Julian F Fleron*, Volker Ecke, Christine von Renesse and Philip K Hotchkiss, Westfield State University (1077-H1-1603)

Nate L. Coursey, Kennesaw State University (1077-H1-844)

3:00PM (1257) Orthogonal Graph Colorings.
Serge C. Ballif, Penn State University (1077-H1-850)

3:20PM (1258) Magic Squares and Sudoku.
John Lorch, Ball State University (1077-H1-505)

Erik Lewis*, UCLA, and George Mohler, Santa Clara University (1077-VG-2156)

2:30PM (1265) Laser propagation in biaxial liquid crystal polymers.
Eric P Choate, Naval Postgraduate School (1077-VG-2510)

Qiang Du, Pennsylvania State University, Lili Ju, University of South Carolina, Li Tian* and Kun Zhou, Pennsylvania State University (1077-VG-1691)

3:30PM (1269) Computational Sensors As Mathematical Models.
Emek Kose, Saint Mary’s College Of Maryland (1077-VG-2918)

1:00PM – 3:40PM Room 206, Hynes

SIAM Minisymposium on Sparsity in Inverse Problems and Signal Processing

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)
AMS Panel Discussion

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

MAA-Young Mathematicians Network Panel Discussion

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

MAA Committee on Minority Participation/MAA Office of Minority Participation Panel Discussion

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

2:00 PM - 4:00 PM  Veteran's Auditorium, 2nd floor, Hyne

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.
Aloyuis 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*, Ana Lucia 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
2:00PM  Empowering Student Learning in Mathematical Analysis.  
(B297)  
Barbara Shipman, The University of Texas at Arlington  
2:00PM  MathDL Books Online.  
(B298)  
David Smith* and Lang Moore, Duke University  
2:00PM  New Directions for MathDL.  
(B299)  
Lang Moore* and David Smith, Duke University  
2:00PM  STEM Real World Applications of Mathematics.  
(B300)  
Darren Narayan* and William Basener, Rochester Institute of Technology  
2:00PM  PREP: MAA’s Professional Development Program.  
(B301)  
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  Dynamic Visualization Tools for Multivariable Calculus.  
(B302)  
Pau Seeburger, Monroe Community College  
2:00PM  Lunch, Educational Software for Writing Proofs.  
(B303)  
Kenneth G. Monks*, University of Scranton, and Nathaniel Carter, Bentley University  
2:00PM  Flash Applets for WebWork Online Homework System.  
(B304)  
Barbara Margolius*, Felipe Martins, Cleveland State University, Dan Gries, Hopkins School, and Yuping Wu, Cleveland State University  
2:00PM  Maple for Calculus.  
(B305)  
Douglas B. Meade*, University of South Carolina, and Philip B. Yasskin, Texas A & M University  
2:00PM  Playing Games with a Purpose: A New Approach to Teaching and Learning Statistics.  
(B306)  
Shonda R. Kuiper, Grinnell College, Rodney Sturdivant*, Billy Kaczynski, John Jackson and Kevin Cummiskey, United States Military Academy  
2:00PM  UBM-Group: Collaborations on Riverine Ecology (CORE): Investigations into species invasion and disease transmission at the interface between mathematics and biology.  
(B307)  
James Peirce* and Gregory Sandland, University of Wisconsin - La Crosse  
2:00PM  Texas Middle and Secondary Mathematics Project.  
(B308)  
Kimberly Childs, Stephen F. Austin State University  
2:00PM  Texas Leadership Initiative: Mathematics Instruction Transformed (Texas LIMIT).  
(B309)  
Kimberly Childs*, Deborah Pace, Lesa Beverly and Betty Alford, Stephen F. Austin State University  
2:00PM  Talented Teachers in Training for Texas (T4).  
(B310)  
Lesa Beverly*, Keith Hubbard, Karen Embry-Jenlink and Dennis Gravatt, Stephen F. Austin State University  
2:00PM  Paradigms in Physics: Interactive Electromagnetism Curricular Materials.  
(B311)  
Tevian Dray*, Corinne A. Manogue and Emily H. van Zee, Oregon State University  
2:00PM  Mathematical ACES: Algebraic Concepts for Elementary Students.  
(B312)  
Davida Fischman*, Shawn McMurran, Joseph Jesunathadas, California State University-San Bernardino, Karla Wells, Ontario Montclair Elementary School District, and Carol Cronk, San Bernardino Superintendent of Schools  
2:00PM  Learning Discrete Mathematics and Computer Science via Primary Historical Sources.  
(B313)  
Jerry Lodder* and David Pengelley, New Mexico State University  
2:00PM  Linear Algebra in New Environments (LINE).  
(B314)  
Draga Vidakovic*, Georgia State University, Sergiu Loch, Grand View University, William Martin, North Dakota State University, and Jeff Suzuki, Brooklyn College  
2:00PM  Careers in Mathematics.  
(B315)  
Michael Dorff, Brigham Young University  
2:00PM  Math Images.  
(B316)  
Eugene Klotz*, Math Forum, and Camila Smith Barnes, Sweet Briar College  
2:00PM  Illustrating Graph Theory Concepts in Real World Settings.  
(B317)  
Joan M. Lucas* and Rebecca Smith, The College at Brockport, State University of New York  
2:00PM  Undergraduate Research in Mathematical Biology: Modeling cellular processes from bacteria to neurons.  
(B318)  
George Yates*, Jonathan Caguiat, Jozsi Jalics, Gary Walker and Mark Wombles, Youngstown State University  
2:00PM  University Scholars in STEM.  
(B319)  
Leah Gold, Cleveland State University  
2:00PM  Improving the Learning Environment for Underrepresented Students in Mathematics through the S-STEM Program.  
(B320)  
Alexandra Kurepa, North Carolina A&T State University  
2:00PM  Research, Dissemination, and Faculty Development of Inquiry-Based Learning (IBL) Methods in the Teaching and Learning of Mathematics.  
(B321)  
Ralf Spatzier, University of Michigan
2:00PM  Distributome: An Interactive Web-based Resource for Probability Distributions. Kyle Siegrist*, University of Alabama in Huntsville, Dennis Pearl, The Ohio State University, and Ivo Dinov, University of California Los Angeles

2:00PM  Resources for Instructors Teaching "Elementary Mathematics for Teachers". Thomas H. Parker* and Scott Baldridge, Louisiana State University

2:00PM  Undergraduates Learning to Write Mathematics: The Math Images Project. K. A. Renninger*, A. M. Phillips, A. Lipman and Gene Klotz, Swarthmore College

2:00PM  Discovering the Art of Mathematics. Julian F. Fleron*, Volker Ecke, Philip K. Hotchkiss and Christine von Renesse, Westfield State University

2:00PM  Introducing Statistical Techniques Through Guided Interdisciplinary Research Projects. Shonda Kuiper, Grinnell College

2:00PM  Math for America Boston: Teaching Scholars Program. Eileen Lee*, Math for America Boston, Steve Rosenberg, Suzanne Chapin and Glenn Stevens, Boston University

2:00PM  Focus on Mathematics: Creating Learning Cultures for High Student Achievement: A targeted Math and Science Partnership. Una MacDowell*, Education Development Center, Inc, Steve Rosenberg, Glenn Stevens, Boston University, Al Cuoco, Education Development Center, Inc, and Wayne Harvey, Education Development Center, Inc.

2:00PM  Resequencing Calculus. Mark Gruenwald* and David Dwyer, University of Evansville

2:00PM  Quantitative Skills in Biology through Scientific Inquiry at James Madison University. Brian Walton*, Anthony Tongen, Nusrat Jahan and Reid Harris, James Madison University

2:00PM  Project MOSAIC: Integrating Modeling, Statistics, Computation and Calculus in the Undergraduate Curriculum. Daniel Kaplan*, Macalester College, Randall Pruim, Calvin College, Eric Marland, Appalachian State University, and Nicholas Horton, Smith College

2:00PM  Biology and Mathematics in Population Studies (BioMAPS) II. Donald Adongo*, K. Renee Fister, Terry Derting, Chris Mecklin, Claire Fuller, Kate He, Emily Croteau, Maeve McCarthy and Howard Whiteman, Murray State University

2:00PM  DIYModeling (Do It Yourself Modeling). Frank Wattenberg*, Rod Sturdivant, Chris Weld, United States Military Academy, Jim Rolf, United States Air Force Academy, Bill Bauldry, Appalachian State University, Joe Yanik and Betsy Yanik, Emporia State University

2:00PM  WeBWorK: Improving Student Success in Mathematics. Arnold Pizer*, Mike Gage, Vicki Roth, University of Rochester, Michael Pearson and John Wyatt, Mathematical Association of America

2:00PM  The Impact of the PREP 2011 Workshops on Bioinformatics Research and Teaching Activities at Jacksonville State University. Monica Trifas*, Aaron Garrett, Jimmy Triplett and Chris Murdock, Jacksonville State University

2:00PM  An Integrative Analysis of Human Cancer: Exploiting the Synergy of Mathematical and Molecular Biological Approaches in Studying a Complex Problem. Jeffrey Forrester* and Michael P. Roberts, Dickinson College

AMS Invited Address

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)

MAA/Young Mathematicians Network Panel Discussion

2:40 PM – 4:00 PM  Room 309, Hynes

Hit the ground running! Interview like a pro and land the job.

Organizers: Kristine Roinesead, 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
MAA Panel Discussion

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

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

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

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 Reception

5:30 PM – 6:30 PM Ballroom C, 3rd floor, Hynes

SIGMAA on Environmental Mathematics Business Meeting

5:30 PM – 7:00 PM Room 311, Hynes

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

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

5:45 PM – 7:15 PM Room 201, Hynes

MAA Two-Year College Reception

5:45 PM – 7:00 PM Arlington, 3rd Floor, Marriott

SIGMAA on Mathematicians in Business, Industry, and Government Guest Lecture, Reception, and Business Meeting

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

6:00 PM – 7:00 PM Room 202, Hynes

Young Mathematicians’ Network Open Forum

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
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, Jelisi 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)
Chelsea R. Snyder* and Christina C. Scurlock, Grove City College (1077-05-40)

10:30AM (1347)
Restricted Symmetric Signed Permutations.
Andy Hart 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)

10:00AM (1351)
Kristin L. Umland, University of New Mexico (1077-97-644)

10:30AM (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)

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 (1353)
Faster deterministic integer factorization.
David Harvey, University of New South Wales (1077-11-881)
8:00AM  Stability and bifurcations in an epidemic model with nonlinear incidence rate and varying immunity period. Preliminary report.
Rebecca Segal, Virginia Commonwealth University

AMS Special Session on Algebraic and Geometric Aspects of Integrable Systems and Random Matrices, I

8:00AM – 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  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)

AMS Special Session on Advances in Mathematical Biology, I

8:00 AM – 10:50 AM  Simmons, 3rd Floor, Marriott
Organizers: David Chan, Virginia Commonwealth University

8:00AM  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)
AMS Special Session on Arithmetic Geometry, II

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

8:00 AM Abelian surfaces with extra endomorphisms.
Reinier Broker*, Brown University, Kristin Lauter, Microsoft Research, and Marco Streng, University of Warwick (1077-14-960)

8:30 AM Automorphism groups of a family of maximal curves.
Robert M. Guralnick, University of Southern California, Beth Malmskog*, Wesleyan University, and Rachel Pries, Colorado State University (1077-11-2028)

9:00 AM Genus 2 curves with (4, 4)-split Jacobians.
Nils Bruin and Kevin Doerkson*, Simon Fraser University (1077-11-2125)

9:30 AM Decomposing Jacobian Varieties of Curves.
Jennifer Paulhus, Grinnell College (1077-11-2349)

10:00 AM On the arithmetic of the Legendre curve in a tower of function fields. Preliminary report.
Douglas Ulmer, Georgia Institute of Technology (1077-11-2192)

10:30 AM An arithmetic intersection formula for denominators of Igusa class polynomials. Preliminary report.
Kristin Lauter, Microsoft Research, and Bianca Viray*, Brown University (1077-11-718)

AMS Special Session on Calculus of Functors and Its Applications, I

8:00 AM – 10:50 AM Exeter, 3rd Floor, Marriott
Organizers: Brian Munson, Wellesley College

8:00 AM β ensemble on a Jordan curve. Preliminary report.
Seung Yeop Lee*, Caltech, and Nikolai Makarov, Caltech.edu (1077-60-1213)

9:30 AM A matrix model for simple Hurwitz numbers and topological recursion.
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)

10:00 AM Dyson’s Brownian Motions and Critical Diffusions.
Mark A Adler, Brandeis University (1077-60-2222)

AMS Special Session on Combinatorial Geometry of Polytopes, III

8:00 AM – 10:50 AM Room 101, Hynes
Organizers: Egon Schulte, Northeastern University
Asia Ivic Weiss, York University

8:00 AM Symmetries of Equivelar Toroids.
Asia Ivic Weiss*, York University, Isabel Hubard, UNAM Mexic City, Mexico, Alen Orbanić, University of Ljubljana, Slovenia, and Daniel Pellicer, UNAM Morelia, Mexico (1077-52-614)

8:30 AM Equivelar 4-twistoids.
Mark Mixer*, York University, Isabel Hubard, Daniel Pellicer, UNAM, and Asia Ivic Weiss, York University (1077-52-2512)

9:00 AM Projective Polytopes. Preliminary report.
Javier Bracho, UNAM (1077-52-2607)

9:30 AM Non-Triangulatatable Polyhedra.
B. Carrigan, Auburn University (1077-52-1643)

10:00 AM The Law of Aboav–Weaire and its analogue in three dimensions.
Richard Ehrenborg*, University of Kentucky, Menachem Lazar, Institute for Advanced Study, and Jeremy Mason, Lawrence Livermore National Laboratory (1077-52-866)

10:30 AM Vertex-transitive polyhedral maps and actions of discrete groups on surfaces.
Roman Nedela, Matej Bel University, Banska Bystrica, Slovak rep. (1077-05-852)
AMS Special Session on Control Theory and Inverse Problems for Partial Differential Equations, II

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

Carleman estimates for systems of partial differential equations.
Matthias Eller, Georgetown University (1077-35-2369)

8:30 AM  The Calderon Problem with Partial Data.
Gunther Uhlmann, University of Washington (1077-35-2584)

9:00 AM  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)

9:30 AM  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)

10:00 AM  Hybrid inverse problems and internal functionals.
Guillaume Bal, Columbia University (1077-35-532)

10:30 AM  Solving Linear Differential Equations in terms of Hypergeometric Functions.
Tingting Fang* and Mark van Hoeij, Florida State University (1077-34-1224)

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

Packing dimension of images of additive Lévy processes.
Liang Zhang, University of Utah (1077-60-1001)

8:30 AM  Correlation-length bounds, and estimates for intermittent islands in parabolic SPDEs.
Davar Khoshnevisan, University of Utah (1077-60-1461)

9:00 AM  Multifractal analysis of Lévy fields.
Arnaud Durand*, Univ. Paris-Sud, and Stephane Jaffard, Univ. Paris-Est (1077-60-1304)

9:30 AM  Fractal properties of the Schramm-Loewner evolution.
Gregory F Lawler, University of Chicago (1077-60-609)

10:00 AM  On-diagonal oscillation of the heat kernels on p.c.f. self-similar fractals.
Naotaka Kajino, University of Bielefeld (1077-60-952)

10:30 AM  The Geometry of the Mandelbrot Set.
Robert L. Devaney, Boston University (1077-37-1601)

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

Packing dimension of images of additive Lévy processes.
Liang Zhang, University of Utah (1077-60-1001)

8:30 AM  Correlation-length bounds, and estimates for intermittent islands in parabolic SPDEs.
Davar Khoshnevisan, University of Utah (1077-60-1461)

9:00 AM  Multifractal analysis of Lévy fields.
Arnaud Durand*, Univ. Paris-Sud, and Stephane Jaffard, Univ. Paris-Est (1077-60-1304)

9:30 AM  Fractal properties of the Schramm-Loewner evolution.
Gregory F Lawler, University of Chicago (1077-60-609)

10:00 AM  On-diagonal oscillation of the heat kernels on p.c.f. self-similar fractals.
Naotaka Kajino, University of Bielefeld (1077-60-952)

10:30 AM  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 (1413) Mathematical Texture Analysis.
Helmut Schaeben, Geophysics and Geoscience Informatics, TU Bergakademie Freiberg

9:00AM (1414) Regularization of Tomographic Inverse Problems in Geophysics.
Volker Michel, Geomathematics Group, University of Siegen, Germany

10:00AM (1415) Sparse Approximation on the Sphere - A Matching Pursuit with a Kernel Based Dictionary.
Roger Telschow, Geomathematics Group, University of Siegen

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 (1417) On the equivariant cohomology of Stiefel manifolds. Preliminary report.
William C Kronholm, Whittier College

8:30AM (1418) Cohomology of equivariant Grassmannians and motivic characteristic classes for quadratic bundles.
Daniel Dugger, University of Oregon

9:00AM (1419) Global equivariant homotopy theory.
Anna Marie Bohmann, Northwestern University

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 (1423) Graham’s Variety and Perverse Sheaves on the Nilpotent Cone.
Ellen J Goldstein, Northwestern University

9:00AM (1425) Algebraic Frobenius splitting of bundles on flag varieties. Preliminary report.
Chuck Hague, University of Delaware

Nicole Lemire, University of Western Ontario

10:00AM (1427) Reduced Null Cones.
Eric Sommers, University of Massachusetts at Amherst

10:30AM (1428) On a duality for nilpotent orbits. Preliminary report.
William G. Dwyer, Notre Dame, and Kari Ragnarsson*, Google/ALM

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
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

8:00 AM Free Inequalities. Preliminary report.
Scott McCullough, University of Florida
(1077-47-1176)

8:30 AM Noncommutative Inequalities.
J. William Helton, UCSD La Jolla, California
(1077-46-1641)

9:00 AM Noncommutative Real Ideals and an Algorithm for Computing Them.
Christopher S Nelson, University of California, San Diego
(1077-47-2006)

9:30 AM Noncommutative analytic functions.
Dmitry Kaliuzhnyi-Verbovetskyi, Drexel University
(1077-46-909)

10:00 AM Noncommutative functions: examples and key features.
Victor Vinnikov, Ben Gurion University
(1077-47-2691)

10:30 AM Dilation theory, commutant lifting and semicrossed products.
Kenneth R. Davidson, University of Waterloo
(1077-47-616)

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-Inq W. Roeger, Texas Tech University

8:00 AM 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)

8:30 AM 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)

9:00 AM 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)

9:30 AM Modeling the spread of waterborne disease: Incorporating heterogeneity in geometric connections.
Suzanne L. Robertson, Mathematical Biosciences Institute
(1077-92-1638)

10:00 AM Seasonality in Avian Influenza H5N1.
Necibe Tuncer, University of Tulsa, and Maia Martcheva*, University of Florida
(1077-92-233)
AMS Special Session on Recent Trends in Graph Theory, I

8:00 AM – 10:50 AM  Room 102, Hynes
Organizer: Raluca Gera, Naval Postgraduate School

8:00 AM
Closed 3-stop distance in graphs.
Raluca Gera*, Naval Postgraduate School, Linda Eroh and Steven Winters, University of Wisconsin Oshkosh (1077-05-1637)

8:30 AM
The Independence Number for the Generalized Petersen Graphs.
Joseph Fox*, Salem State University, Raluca Gera and Pantelimon Stanica, Naval Postgraduate School (1077-05-722)

9:00 AM
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)

9:30 AM
A fractional analogue of Brook’s theorem.
Xing Peng* and Linyuan Lu, University of South Carolina (1077-05-611)

10:00 AM
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)

10:30 AM
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)

MAA Invited Paper Session on Contemporary Unsolved Problems

8:00 AM – 10:45 AM  Room 302, Hynes
Organizers: Ellen Kirkman, Wake Forest University
Jeremy Rouse, Wake Forest University

8:00 AM
C Eugene Wayne, Boston University (1077-AF-1011)

8:45 AM
The Smooth Four Dimensional Poincare Conjecture.
Joel Hass, UC Davis (1077-AF-1795)

9:30 AM
Beyond Computation: The P versus NP question.
Michael Sipser, MIT (1077-AF-1281)

10:15 AM
The Birch and Swinnerton-Dyer Conjecture.
William Arthur Stein, University of Washington (1077-AF-2094)

MAA Invited Paper Session on Knot Theory Untangled

8:00 AM – 10:50 AM  Room 311, Hynes
Organizer: Rolland Trapp, California State University, San Bernardino

8:00 AM
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.)

AMS Session on Algebraic Geometry, II

8:00 AM – 9:40 AM Room 209, Hynes

8:00 AM Patch Ideals and Peterson Varieties.
(1472) Erik A Insko*, University of Iowa, and Alexander Yong, University of Illinois at Urbana-Champaign (1989)

8:15 AM An obstruction in extending Abhyankar’s results for the Jacobian conjecture.
(1473) James C Price, University of Arkansas at Fort Smith (174)

8:30 AM Affine fibrations and Vénèreau-type polynomials.
(1474) Drew Lewis, Washington University in St. Louis (1412)

8:45 AM Resolving Collinearity Among Four Points in the Complex Projective Plane.
(1477) Victor I Piercey, University of Arizona (1430)

9:00 AM Polyhedral Methods for Space Curves and Two Dimensional Surfaces Exploiting Symmetry.
(1476) Danko Adrovic and Jan Verschelde, University of Illinois at Chicago (1494)

9:15 AM Connectedness of moduli spaces of line arrangements.
(1477) Fei Ye, Bar-Ilan University (1485)

AMS Session on Associative and Nonassociative Algebras and Rings: Homological Algebras and Category Theory, I

8:00 AM – 9:40 AM Room 308, Hynes

8:00 AM Representations of rank two affine Hecke algebras at roots of unity.
(1479) Matt S Davis, Harvey Mudd College (1659)

8:15 AM Stable Endomorphism Rings.
(1480) Shannon Talbott, The University of Iowa (1984)

8:30 AM Deformations of an Algebra. Preliminary report.
(1481) Jeanette Shakalli, Texas A&M University (1796)

8:45 AM Twisted Nilmanifolds and Dilogarithmic OPEs.
(1482) Marco A Aldi*, Brandeis University, and Reimundo Heluani, IMPA (2259)

9:00 AM Delayed Koszul Duality. Preliminary report.
(1483) Christopher L Phan, Bucknell University (2186)

9:15 AM Graded Skew Clifford Algebras that are Twists of Graded Clifford Algebras.
(1484) Manizheh Nafari* and Michaela Vancliff, University of Texas at Arlington (1382)

9:30 AM Some New Results on Albert-Like Semifield Planes. Preliminary report.
(1485) Angela M. Brown, University of Texas at Arlington (2711)

AMS Session on Combinatorics and Graph Theory, V

8:00 AM – 10:10 AM Room 111, Hynes

8:00 AM Transitive BLT-sets. Preliminary report.

8:15 AM Graphs with $(k \pm \epsilon)$-edge-disjoint spanning trees.
(1487) Ping Li, West Virginia University (1949)

8:30 AM Limits, Regularity and Removal for Relational Structures: A measure theoretic approach.
(1488) Ashwin Aroskar* and James Cummings, Carnegie Mellon University (1941)

8:45 AM Group Connectivity in Line Graphs.
(1489) Senmei Yao, West Virginia University (1924)

9:00 AM Edge disjoint isomorphic subgraphs in uniform hypergraphs.
(1490) Paul Horn*, Harvard University, Václav Koubek, Charles University, and Vojtěch Rödl, Emory University (1874)

9:15 AM Extremal Sizes of Subspace Partitions.
(1491) Olof Heden, KTH, Sweden, Julianne Lehmann, Hamburg, Germany, Esmeralda Nastase*, Xavier University, and Papa Sissokho, Illinois State University (1839)

9:30 AM On 3-nets realizing a finite group in a projective plane.
(1492) Nicola Pace, Florida Atlantic University (2026)
AMS Session on Commutative Rings and Algebras, II
8:00 AM – 9:40 AM Room 105, Hynes

8:00 AM
A note on generalized Gorenstein complexes.
Eero Hyry and Maryam Akhavian*, University of Tampere (1077-13-804)

8:15 AM
Finding generators for the vanishing ideal of a finite set of points.
Eddy Campbell and Jianjun Chuai*, University of New Brunswick (1077-13-583)

8:30 AM
Cut Structures in Zero-divisor Graphs.
M Axtell, University of St. Thomas, N Baeth*, University of Central Missouri, and J Stickles, Millikin University (1077-13-355)

8:45 AM
Factoring formal power series over principal ideal domains.
Jesse Elliott, California State University, Channel Islands (1077-13-339)

9:00 AM
Neil Epstein*, University of Osnabrueck, and Javid Validashti, University of Illinois at Urbana-Champaign (1077-13-125)

9:15 AM
Integration and Primary Decomposition.
Brian L Miller, Texas Tech University (1077-13-125)

9:30 AM
Dennis Moore* and Uwe Nagel, University of Kentucky (1077-13-637)

AMS Session on Computer Science, Information, Control Theory, and Economics, I
8:00 AM – 10:25 AM Room 303, Hynes

8:00 AM
Price Discrepancy and Optimal Liquidation of Credit Derivatives.
Peng Liu*, Johns Hopkins University, and Tim Leung, IEOR Department, Columbia University (1077-93-782)

8:15 AM
Egalitarian Graph Orientations.
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)
AMS Session on Undergraduate Research, V

8:00 AM – 10:25 AM  Room 110, Hynes

8:00 AM  Permutations, Pattern Avoidance, and the Catalan Triangle. Preliminary report.
Wesley K. Hough*, Hanover College, Derek F. DeSantis, California State University Channel Islands, Jacob W. Ziefe, The College of New Jersey, and Rebecca M. Meissens, Worcester Polytechnic Institute (1077-05-2295)

8:15 AM  Numerical Methods for Optimizing Chemistry Kinetic Parameters.
Victoria Marsh*, Jen-Mei Chang, and Stephen Mezyk, California State University, Long Beach (1077-65-2777)

Josh Koslosky, University of Minnesota, Stacey Levine and Glenn Sidle*, Duquesne University (1077-68-1967)

8:45 AM  Stability Analysis of Plate Deformation Equations Derived using the Hamiltonian Principle.
Charles Yves Daly, CSUMS/George Mason University (1077-74-2143)

9:00 AM  Optimizing Plasmonic Effects for a More Efficient Nanoscale Biophotovoltaic Device.
J. E. Pina, George Mason University (1077-78-2252)

9:15 AM  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)

Aniket Anil Panjwani, George Mason University (1077-91-1832)

9:45 AM  Sequences for Solving Puzzles and Touring Graphs.
Tsell Schramm*, Harvey Mudd College, and Emily Carlson, Bard College (1077-91-2023)
10:00AM Effects of Non-Independent Behavior on a Macroeconomic Model. 
Nicholas S Chaung, George Mason University (1077-91-2426)

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

10:00AM The Volume and Surface Area of a Toy Train. 
Paul C Fonstad, Dalton State College (1077-11-1440)

10:20AM A modeling project on sensor networks. 
Marian F Anton, Ripon College (1077-11-2658)

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. 
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. 
Jackie A Hall, Longwood University (1077-L1-1247)

8:40AM Final Project in an Elementary Cryptology Course. 
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. 
Emelie A Kenney, Siena College (1077-L1-517)

9:20AM Reading, Writing and Discussing Mathematics in a Service-level Undergraduate Course. 
Daniel P. Wisniewski, DeSales University (1077-L1-282)

10:00AM Visualizing Hyperbolic Geometry in the Liberal Arts. 
Charlotte J. Chell, Carthage College (1077-L1-2835)

10:20AM Using a jeopardy Game to Engage Students’ Learning. 
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. 
Cesar E. Silva, Williams College (1077-N5-2680)
Program of the Sessions – Boston, MA, Friday, January 6 (cont’d.)

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

8:00 AM (1565) History of National Meetings. Preliminary report.
Kenneth A Ross, University of Oregon (1077-Q1-1710)

8:20 AM (1566) A History of the Northeastern Section: A Work in Progress.
J. J. Tattersall, Providence College (1077-Q1-481)

8:40 AM (1567) Highlights in the History of the Missouri Section.
Leon M. Hall, Missouri S&T (1077-Q1-334)

9:00 AM (1568) Recovering and recapitulating the history of Project NExT. Preliminary report.
T. Christine Stevens, Saint Louis University (1077-Q1-2032)

9:20 AM (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)

9:40 AM (1570) The Kansas Section: Were We First?

10:00 AM (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)

10:20 AM (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)

10:40 AM (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

8:00 AM (1574) Inverse Modeling by
Cumulative-Power-Penalized Least Squares.
Keaton P. Quinn, Michigan State University (1077-VK-2408)

8:15 AM (1575) Revisiting the Basel problem.
Marianne Dubinsky, University of Mary Washington (1077-VK-2395)

8:30 AM (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.
Yuri Shlapak, University of Wisconsin - Madison, Wood County and University of Wisconsin Colleges Online (1077-VK-1803)

8:45 AM (1577) Searching for the Best Quadratic
Approximation of a Function.
Yajun Yang* and Sheldon P. Gordon, Farmingdale State College of SUNY (1077-VK-2209)
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

9:00 AM – 10:55 AM
MAA General Contributed Paper Session: Research in Number Theory

9:00 AM
TPA: A New Method for Approximate Counting.
Mark Huber, Claremont McKenna College, and Sarah Schott, Duke University (1077-VK-802)

9:15 AM
Molecular mechanism for cardiac electrical instability in human heart disease: a predictive and multiscale computational model of “ankyrin-B syndrome.”
Roseanne M Wolf, Colleen C Mitchell, University of Iowa, Peter Mohler and Thomas Hund, The Ohio State University (1077-VK-2383)

9:30 AM
A Markov Model for Actin Polymer Dynamics and Cell Membrane Proliferation.
Csilka Szabo, United States Military Academy (1077-VK-2811)

9:45 AM
The logistic gender-structured model with ephemeral pair bonds and isolation from reproduction (report on an REU project at Valparaiso University).
Daniel Maxin, Valparaiso University, Ludek Berec, Department of Biosystematics and Ecology, Institute of Entomology, Biology Centre ASCR, Czech Republic, Michael Covello, Loyola University Chicago, Jill Jessee, Simpson College, and Matthew Zimmer, Saint John’s University (1077-VK-1216)

10:00 AM
Extremes of multi-stability in a chemical model system.
Ravi Chityala, Minnesota Supercomputing Institute (1077-VK-799)

10:15 AM
Method to extract names of geographical features from images of maps - A theoretical case study, Preliminary report.
Sridevi Pudipeddi, South Central College, North Mankato, MN, and Ravi Chityala, Minnesota Supercomputing Institute (1077-VK-799)

10:30 AM
Recovery of Fourier Transforms Using Edge Information.
Alexander J Gutierrez, Arizona State University (1077-VK-2752)

10:45 AM
Encrypting into Polynomials. Preliminary report.
Lavinia Ciungu and Mark Wissler, University of Central Oklahoma (1077-VJ-2131)

11:00 AM
Explicit Plancherel Measure for $PGL_2$ over a $p$-adic field.
Carlos De la Mora, University of Iowa (1077-VJ-2839)

11:15 AM
$p$-adic $L$-functions of $GL_2$ automorphic representations. Preliminary report.
Bez Zhang, Northwestern University, and Matthew Emerton, University of Chicago (1077-VJ-660)

11:30 AM
The Distribution of Generalized Ramanujan Primes.
Nadine Amersi, University College London, Olivia Beckwith, Harvey Mudd College, Steven J Miller, Williams College, Ryan Ronan, The Cooper Union, and Jonathan Sondow, New York City, NY (1077-VJ-1449)

11:45 AM
Primes of the Form $x^2 + ny^2$ and the Geometry of Convenient Numbers.
Thomas R. Hagedorn, The College of New Jersey (1077-VJ-2605)

12:00 PM
Gaps between summands in generalized Zeckendorf decompositions.
Olivia Beckwith, Harvey Mudd College, and Steven J Miller, Williams College (1077-VJ-1164)

12:15 PM
Constructing Generalized Sum-Dominant Sets.
Geoffrey S Iyer, University of Michigan, Oleg Lazarev, Princeton University, and Liyang Zhang, Williams College (1077-VJ-946)

12:30 PM
Evaluating of infinite products involving Fibonacci and Lucas numbers.
Jonathan Sondow, New York, NY (1077-VJ-2416)

12:45 PM
Sequences preserving GCD, Cyclotomic Polynomials, and Iterated Polynomials. Preliminary report.
Stephen Lovett, Wheaton College (IL) (1077-VJ-369)

1:00 PM
Distribution of Missing Sums in Sumsets.
Jonathan Sondow, Princeton University (1077-VJ-1409)

1:15 PM
Examining the Dynamical Systems of Various Polynomials over Finite Fields Using Mathematica.
Jonathan Weisbrud, Rowan University (1077-VJ-479)

8:00 AM – 10:55 AM
Room 201, Hynes

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

8:00 AM
Mark Wissler and Lavinia Ciungu, University of Central Oklahoma (1077-VJ-2130)
Program of the Sessions – Boston, MA, Friday, January 6 (cont’d.)

Aliza Steurer, Dominican University
8:00AM Numerical Method/Analysis Students Function Concept Knowledge.
Emre Tokgoz, University of Oklahoma (1077-VD-474)

8:15AM 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 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 Scaffolding for Inquiry Instruction in Mathematics.
Mark L. Daniels, UTeach Program Natural Sciences/ University of Texas at Austin (1077-VD-342)

9:00AM An inquiry-based, writing intensive introduction to proofs course. Preliminary report.
Carl Mummert, Marshall University (1077-VD-1567)

9:15AM Keep them guessing: teaching conjecturing in a discrete transition course. Preliminary report.
Suzanne I Doree, Augsburg College, Minneapolis (1077-VD-2841)

9:30AM Using a capstone course to learn how to teach mathematical proofs.
Elana Reiser, St. Joseph’s College (1077-VD-77)

9:45AM Getting the Act Together. Preliminary report.
Melvin G. Royer, Indiana Wesleyan University (1077-VD-2519)

10:00AM Some Strategies for Teaching a Course Based on Douglas Hofstadter’s Godel, Escher, Bach. Preliminary report.
Stephen Andrilli, La Salle University, Philadelphia, PA (1077-VD-2841)

10:15AM Developing the capstone experience at Winthrop University. Preliminary report.
Trent Kull* and Heakyung Lee, Winthrop University (1077-VD-836)

10:30AM 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 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 Applied Mathematics Outreach to Middle and High Schools: Opportunities and Resources.
Peter R Turner, Clarkson University (1077-97-303)

8:30AM Scrapheap Showdown and Pi Night: Two Ways to Reach out to the Local Community.
Erica Dakin Voolich, Somerville Mathematics Fund (1077-97-1959)

9:00AM Applied Mathematical Modeling and Research Opportunities for Middle School, High School, and Pre-Freshmen Students.
Kathleen R Fowler, Clarkson University (1077-97-395)

C. Kenneth Fan, Girls’ Angle (1077-97-1094)

10:00AM Trees and Soil Microbes: Activities for Bringing Life (Science) to Mathematics. Preliminary report.
Kelly K. Sturman*, National Institute for Mathematical and Biological Synthesis, and Suzanne Lenhart, University of Tennessee (1077-97-978)

10:30AM 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 and Laihan Luo, New York Institute of Technology

8:30AM From Euler equation to Boussinesq system to KP equation.
Min Chen, Purdue University (1077-35-2223)
9:00AM Nonlocal dissipation and the Euler Equations. Peter Constantin*, Princeton University, and Vlad Vicol, University of Chicago (1077-35-2321)

9:30AM 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 Carrier Shocks and Coherent Structures in the Nonlinear Maxwell Equation. Michael I. Weinstein, Columbia University (1077-35-2813)

10:30AM The surface quasi-geostrophic and related equations. Jiahong Wu, Oklahoma State University (1077-35-1765)

AMS-MAA Grad School Fair
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
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
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
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
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

MAA Minicourse #14: Part B
9:00 AM – 11:00 AM Salon HI, 4th Floor, Marriott


MAA Session on Quantitative Literacy and Decision Making
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 Using MS Excel to Improve Understanding of Financial Mathematics. Paul Taylor, Shippensburg University (1077-L5-930)


10:00AM 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
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

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### MAA Panel Discussion

**MAA Panel Discussion**  
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

**MAA Committee on Assessment Panel Discussion**  
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

**Student Hospitality/Information Center**  
9:00 AM – 5:00 PM  
2nd Floor Corridor by Veterans Auditorium, Hynes

### Exhibits and Book Sales

**Exhibits and Book Sales**  
9:30 AM – 5:30 PM  
Exhibit Hall D, Hynes

### AMS Special Presentation

**AMS Special Presentation**  
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

### ASL Invited Address

**ASL Invited Address**  
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

**AMS Invited Address**  
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

**AMS-MAA Invited Address**  
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

**AMS Colloquium Lectures: Lecture III**  
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

**MAA Lecture for Students**  
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

**AMS Current Events Bulletin**  
1:00 PM – 4:45 PM  
Room 200, Hynes  

Organizer: David Eisenbud, University of California Berkeley  
1:00PM  
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  
The cobordism hypothesis: quantum field theory + homotopy invariance = higher algebra.  
Daniel S. Freed, University of Texas at Austin (1077-57-1075)  

3:00PM  
Dispersive equations and their role beyond PDE.  
Gigliola Staffilani, Massachusetts Institute of Technology (1077-35-769)  

4:00PM  
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 – 5:00 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 Warrier, 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 Bogess and Jay Walton, Texas A&M University (1077-92-585)


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 Nassershari*, 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 K3 + e and K4 – 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)
AMS-WM 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  (1662)  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  (1663)  On 2D viscous Boussinesq system on a bounded domain.
Ronghua Pan, Georgia Institute of Technology (1077-35-2375)

2:00PM  (1664)  A semi-hyperbolic region for the pressure gradient system.
Kyungwoo Song*, Yeshiva University and Kyung Hee University, and Yu Xi Zheng,
Yeshiva University (1077-35-2678)

2:30PM  (1665)  Conservation laws with prescribed eigencurves.
Helge Kristian Janssen, Penn State University, and Irina A Kogan*, North Carolina State University (1077-35-204)

3:00PM  (1666)  Some exact solutions to nonlinear hyperbolic PDE.
Robin Young, University of Massachusetts, Amherst (1077-35-632)

Tai-Ping Liu, Academia Sinica and Stanford University, and Yanni Zeng*,
University of Alabama at Birmingham (1077-35-1040)

4:00PM  (1668)  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  (1669)  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)

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  (1653)  Counting decompositions of additive polynomials.
Mark Giesbrecht*, University of Waterloo, and Joachim von zur Gathen, B-IT, Universität Bonn (1077-11-393)

1:30PM  (1654)  Finding a polynomial multiple that is sparse.
Daniel S Roche, United States Naval Academy (1077-68-906)

2:00PM  (1655)  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  (1656)  Non-abelian Cohen-Lenstra Heuristics.
Nigel Boston, University of Wisconsin - Madison (1077-11-188)

3:00PM  (1657)  Families of marked elliptic curves, with some applications.
Noam D. Elkies, Harvard Univ. (1077-11-2569)

3:30PM  (1658)  An irrationality measure for Mahler numbers.
Michael Coons, University of Waterloo and Fields Institute (1077-11-598)

4:00PM  (1659)  Identifying supersingular elliptic curves.
Andrew V. Sutherland, Massachusetts Institute of Technology (1077-11-377)

4:30PM  (1660)  Evaluating Igusa functions.
Reinier Broker*, Brown University, and Kristin Lauter, Microsoft Research (1077-11-961)

5:00PM  (1661)  Positive-definite quadratic forms representing all odd, positive integers.
Preliminary report.
Jeremy Rouse, Wake Forest University (1077-11-116)
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 ▶ (1672) Biological dispersal strategies of Internet worms.
David E Hiebeler, University of Maine (1077-92-1450)

1:30PM ▶ (1673) Modeling and Estimation in Gene Regulatory Networks.
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.
Jianjun Paul Tian, College of William and Mary (1077-92-1751)

2:30PM A Low-Dimensional Model of the Innate Immune Response to Bacterial Infection.
Lester Caudill, University of Richmond (1077-92-851)

3:00PM ▶ (1676) Using a Mathematical Model to Analyze the Treatment of a Wound Infection with Oxygen Therapy. Preliminary report.
Richard Schugart* and Tennesse Tucker Joyce, Western Kentucky University (1077-92-2701)

3:30PM Discussion

4:00PM Nanoparticle Deposition in the Human Nasal Passages.
Rebecca Segal, Virginia Commonwealth University (1077-92-1985)

4:30PM Mechanisms for multiple activity modes of midbrain DA neurons.
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.
Karen A Yokley, Elon University (1077-92-1535)

5:30PM ▶ (1680) 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.
Alexei Borodin, MIT, Caltech (1077-60-1100)

2:00PM Elliptic distributions on 3D Young diagrams, elliptic special functions and elliptic Painlevé. Preliminary report.
Dan Dumitru Betea, Caltech, Pasadena CA (1077-60-1255)

2:30PM Discrete Hamiltonian structure of Schlesinger transformations.
Anton Dzhamay, University of Northern Colorado, Hitaketa Sakai, University of Tokyo, and Tomoyuki Takenawa*, Tokyo University of Marine Science and Technology (1077-33-1948)

3:00PM Degeneration scheme of 4-dimensional Painlevé type equations.
Hirosi Kawakami, Akane Nakamura and Hitaketa Sakai*, University of Tokyo (1077-33-1306)

4:00PM Combinatorics of matrix refactorizations and discrete integrable systems.
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.
Adam Doliwa, University of Warmia and Mazury, Olsztyn, Poland (1077-37-464)

5:00PM Discrete integrable systems of skew orthogonal polynomials.
Hirosi Miki* and Satoshi Tsujimoto, Graduate School of Informatics, Kyoto University (1077-33-969)
### AMS Special Session on Calculus of Functors and Its Applications, II

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1:00 PM</td>
<td>Discussion</td>
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<tr>
<td>1:30 PM</td>
<td>Operads and modules in embedding calculus.</td>
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<td></td>
<td>Gregory Arone*, University of Virginia, and Victor Turchin, Kansas State University (1077-55-1662)</td>
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<tr>
<td>2:30 PM</td>
<td>Splitting in the rational homology and homotopy of the spaces of higher dimensional long embeddings.</td>
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<td></td>
<td>Victor Turchin*, Kansas State University, and Gregory Arone, University of Virginia (1077-55-886)</td>
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<tr>
<td>3:00 PM</td>
<td>Rational homotopy theory and spaces of smooth embeddings. Preliminary report.</td>
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<td></td>
<td>Pascal Lambrechts, Universite catholique de Louvain (1077-55-1654)</td>
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<tr>
<td>4:00 PM</td>
<td>Models for Taylor towers of functors.</td>
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<td>Brenda Johnson*, Union College, Kristine Bauer, University of Calgary, Rosona Eldred and Randy McCarthy, University of Illinois at Urbana-Champaign (1077-55-2097)</td>
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<tr>
<td>4:30 PM</td>
<td>Discussion</td>
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<tr>
<td>5:30 PM</td>
<td>Morava E-theory of the Goodwillie tower.</td>
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<td></td>
<td>Mark J Behrens, MIT (1077-55-1647)</td>
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### AMS Special Session on Differential Algebraic Geometry and Galois Theory (in memory of Jerald Kovacic), III

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<tr>
<td>1:00 PM</td>
<td>Discussion</td>
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<td>1:30 PM</td>
<td>Do high frequencies contain information about low frequencies?</td>
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<td>Laurent Demanet, Massachusetts Institute of Technology (1077-86-2657)</td>
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<tr>
<td>2:00 PM</td>
<td>Transient wave imaging with limited-view data.</td>
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<td>Vincent Jugnon*, Massachusetts Institute of Technology, Habib Ammari, Ecole Normale Superieure, Hyeonbae Kang, Inha University, Mark Asch, University of Picardy Jules Verne, and Lili Guadarrama Bustos, Ecole Superieure de Physique et Chimie Paris (1077-35-744)</td>
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<tr>
<td>2:30 PM</td>
<td>Uniqueness for a hyperbolic inverse problem with angular control of the coefficients.</td>
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<td>Rakesh Rakesh, University of Delaware (1077-35-2410)</td>
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<td>3:00 PM</td>
<td>Enhanced Near-cloak by FSH Lining.</td>
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<td>Hongyu Liu, University of North Carolina (1077-35-2582)</td>
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<tr>
<td>3:30 PM</td>
<td>Discussion</td>
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<td>4:00 PM</td>
<td>Boundary Control Approach to Inverse Problems on Graphs.</td>
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<td>Sergei Avdonin, University of Alaska Fairbanks (1077-35-1501)</td>
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<tr>
<td>4:30 PM</td>
<td>Microlocal analysis of an ultrasound operator with circular source and receiver trajectories.</td>
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<td>Venky P Krishnan, Tata Institute of Fundamental Research Centre for Applicable Mathematics (1077-35-1939)</td>
</tr>
<tr>
<td>5:00 PM</td>
<td>Lipschitz stability of an inverse problem for a Schrödinger type equation.</td>
</tr>
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<td>Lingyun Qiu*, Purdue University, Elena Beretta, Sapienza di Roma, and Maarten de Hoop, Purdue University (1077-35-925)</td>
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<td>Boundary control of a beam equation with non-monotone boundary conditions.</td>
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<td>Irena Lasiecka, University of Virginia, Rich Marchand, U.S. Air Force Academy/Slippery Rock University, and Tim McDevitt*, Elizabethtown College (1077-93-2106)</td>
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### AMS Special Session on Control Theory and Inverse Problems for Partial Differential Equations, III

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<tbody>
<tr>
<td>1:00 PM</td>
<td>Discussion</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>Recent developments in inverse scattering. Preliminary report.</td>
</tr>
<tr>
<td></td>
<td>Gang Bao, Michigan State University and Zhejiang University (1077-35-2373)</td>
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**Program of the Sessions – Boston, MA, Friday, January 6 (cont’d.)**
AMS Special Session on Differential Galois Extensions

1:00PM
Lourdes Juan, Texas Tech University

1:30PM
Constructive approaches to Kovacic’s reduced forms of linear differential systems.
Ainhoa Aparicio-Monforte, RISC, Linz (Austria), Elie Compant, Université de Lille (France), and Jacques-Arthur Weil*, XLIIM, CNRS and Université de Limoges (France) (1077-34-831)

1:30PM
Generic Differential Galois Extensions.
Lourdes Juan, Texas Tech University (1077-13-2280)

2:00PM
Model theory and differential algebraic geometry.
David Marker, University of Illinois at Chicago (1077-03-507)

2:30PM
Some new techniques in differential algebraic geometry from model theory.
Rahim N Moosa, University of Waterloo (1077-03-2035)

3:00PM
Prolongations and differentially closed fields.
Omar Leon Sanchez, University of Waterloo, Ontario, Canada. (1077-14-792)

3:30PM
Tannakian formalism over fields with operators. Preliminary report.
Moshé Kamensky, University of Notre Dame (1077-20-1339)

4:00PM
Linear Equations in Valued D-Fields.
Meghan Anderson, Harvard University (1077-03-1464)

4:30PM
Chromatic quasisymmetric functions and Hessenberg varieties.
John Shareshian, Washington University, and Michelle L Wachs*, University of Miami (1077-05-372)

5:00PM
Vanishing Integrals for Hall-Littlewood Polynomials.
Demir Venciwaneswaran, California Institute of Technology (1077-05-372)

5:30PM
Torus actions, multi-partitions, and crystals.
Steven V Sam* and Peter Tingley, MIT (1077-05-320)

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.
David Applegate, AT&T Shannon Labs, Marc LeBrun, Fixpoint Inc., and Neil J. A. Sloane*, AT&T Shannon Labs (1077-11-104)

AMS Special Session on Fractional, Hybrid, and Stochastic Dynamical Systems with Applications

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.
Mouffak Benchohra, Naima Hamidi, Universite de Sidi Bel-Abbes, and Johnny Henderson*, Baylor University (1077-34-54)
### Program of the Sessions – Boston, MA, Friday, January 6 (cont’d.)

<table>
<thead>
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</tr>
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</table>
| 1:30PM  | Positive solutions for a class of higher order boundary value problems with fractional q-derivatives.  
          | John R. Graef* and Lingju Kong, University of Tennessee at Chattanooga (1077-34-239) |
| 1:30PM  | Projective Representations of the Mapping Class Group coming from the Extended TQFT underlying the Kauffman Bracket.  
          | Charles Frohman*, Michael Fitzpatrick, The University of Iowa, and Joanna Kania-Bartoszynska, The National Science Foundation (1077-57-185) |
| 2:00PM  | Fractional Inequalities Revisited. Preliminary report.  
          | George A Anastassiou, University of Memphis (1077-26-359) |
          | J Diego Ramirez* and Aghalaya S Vatsala, University of Louisiana at Lafayette (1077-34-578) |
          | Zachary Denton* and Aghalaya Vatsala, University of Louisiana at Lafayette (1077-34-1132) |
| 3:00PM  | Stability of stochastic two-scale network delayed SIR epidemic dynamic model with temporary immunity period.  
          | Divine T Wanduku* and Gangaram S Ladde, University of South Florida (1077-60-1064) |
| 3:30PM  | On Higher Order Stochastic differential equations.  
          | Jean-Claude Pedjeu* and G. S. Ladde, University of South Florida (1077-60-1064) |
| 4:00PM  | Existence of multiple solutions for a class of fractional boundary value problems.  
          | Lingju Kong, University of Tennessee at Chattanooga (1077-34-239) |
          | Aghalaya S Vatsala*, University of Louisiana at Lafayette, and Donna Stutson, Xavier University of New Orleans (1077-34-1038) |
| 5:00PM  | Knot concordance and homology  
          | Tim D Cochran, Bridget D Franklin, Rice University, Matthew Hedden, Michigan State University, and Peter D Horn*, Columbia University (1077-57-994) |
| 5:30PM  | Obstructing concordance of related satellite operations.  
          | Bridget D Franklin, Rice University (1077-57-1245) |
| 6:00PM  | Stability of stochastic two-scale network delayed SIR epidemic dynamic model with temporary immunity period.  
          | Divine T Wanduku* and Gangaram S Ladde, University of South Florida (1077-60-1064) |
| 6:30PM  | On Higher Order Stochastic differential equations.  
          | Jean-Claude Pedjeu* and G. S. Ladde, University of South Florida (1077-60-1064) |
| 7:00PM  | Existence of multiple solutions for a class of fractional boundary value problems.  
          | Lingju Kong, University of Tennessee at Chattanooga (1077-34-239) |
          | Aghalaya S Vatsala*, University of Louisiana at Lafayette, and Donna Stutson, Xavier University of New Orleans (1077-34-1038) |

### AMS Special Session on Knot Theory, III

1:00 PM – 5:50 PM  
Provincetown, 4th Floor, Marriott

Organizers: Tim Cochran, Rice University  
            Shelly Harvey, Rice University

1:00PM  
Projective Representations of the Mapping Class Group coming from the Extended TQFT underlying the Kauffman Bracket.  
Charles Frohman*, Michael Fitzpatrick, The University of Iowa, and Joanna Kania-Bartoszynska, The National Science Foundation (1077-57-185)

### AMS Special Session on Linear Algebraic Groups: Their Arithmetic, Geometry, and Representations, III

1:00 PM – 5:50 PM  
Berkeley, 3rd Floor, Marriott

Organizers: R. Skip Garibaldi, Emory University  
            George McNinch, Tufts University
AMS Special Session on Progress in Free Analysis, III

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 (1743) Extended Quotients and Kazhdan-Lusztig Parameters.
Paul Frank Baum, Penn State University (1077-22-653)

1:30PM (1744) Unexpected twists in positive depth L-packets. Preliminary report.
Stephen DeBacker*, University of Michigan, and Loren Spice, Texas Christian University (1077-22-2884)

2:00PM (1745) The Belkale-Kumar cup product.
Sam Evens, University of Notre Dame (1077-17-1471)

2:30PM (1746) Representation Theory of semisimple Lie algebras in positive characteristic. Preliminary report.
Ivan Mirkovic, U. of Massachusetts, Amherst (1077-22-1738)

3:00PM (1747) Regular nilpotent Hessenberg varieties.
Julianna S Tymoczko, Smith College (1077-14-2792)

3:30PM (1748) Special nilpotent orbits and modular Lie algebra representations. Preliminary report.
James E. Humphreys, U. Massachusetts, Amherst (1077-17-453)

4:00PM (1749) G-Galois algebras and a Hasse principle.
Parimala Raman*, Emory University, Atlanta, GA 30322, and Eva Bayer-Fluckiger, EPFL, Lausanne, Switzerland (1077-20-2439)

4:30PM (1750) On the conjecture of Borel and Tits for abstract homomorphisms of algebraic groups.
Igor A. Rapinchuk, Yale University (1077-20-218)

5:00PM (1751) Degree formula for the Euler characteristic.
Olivier Mathieu, University of Nottingham (1077-14-747)

5:30PM (1752) The J-invariant and Tits indices for groups of type E_j.
Caroline Junkins, University of Ottawa (1077-14-1010)

AMS Special Session on Radon Transforms and Geometric Analysis (in honor of Sigurdur Helgason’s 85th birthday), II

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 (1755) A survey of topological free entropy dimension. Preliminary report.
Don Hadwin*, University of New Hampshire, Qihui Li, East China University of Science and Technology (Shanghai), Weihua Li, Columbia College (Chicago), and Junhao Shen, University of New Hampshire (1077-46-701)

2:30PM (1756) Representation formulas for Hardy space functions through the Cuntz relations and new interpolation problems.
Daniel Aron Alpay*, Ben-Gurion University, Palle Jorgensen, University of Iowa, Izchak Lewkowicz, Department of electrical engineering, Ben-Gurion University, and Itzik Marziano, Ben-Gurion University (1077-47-1575)

3:00PM (1757) Characteristic functions of row contractions: unitary equivalence and coincidence.
Vladimir Bolotnikov*, The College of William and Mary, and Joseph A Ball, Virginia Tech (1077-47-1968)

3:30PM (1758) Essential normality of polynomial-generated submodules.
Quanlei Fang*, Bronx Community College, CUNY, and Jingbo Xia, SUNY-Buffalo (1077-47-486)

4:00PM (1759) Extensions of Hilbert Modules over Operator Tensor Algebras.
Andrew K Greene, University of Iowa (1077-46-2437)

James A Mingo*, Queen’s University at Kingston, and Octavio Arizmendi, Université des Saarlandes (1077-46-1856)

5:00PM (1761) Realization and interpolation theory for generalized Schur classes. Preliminary report.
Joseph A. Ball, Virginia Tech (1077-47-200)

5:30PM (1762) Analytic Functions from Tensors.
Paul S. Muhly*, University of Iowa, and Baruch Solel, Technion (1077-46-1704)
### Program of the Sessions – Boston, MA, Friday, January 6 (cont’d.)

**AMC Special Session on Recent Trends in Graph Theory, II**

1:00 PM – 5:50 PM  
Room 102, Hynes

Organizer:  
Rachel Gera, Naval Postgraduate School

- Uniquely $K_r$-saturated graphs.  
  - Preliminary report.  
  - Stephen G Hartke and Derrick Stolee*, University of Nebraska-Lincoln (1077-05-1584)

- On Locating Sets in Graphs.  
  - Bryan A Phinezy, Western Michigan University (1077-05-767)

- 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)

- On cubic non-toroidal graphs.  
  - Stan Dziobiak*, University of Mississippi, and Guoli Ding, Louisiana State University (1077-05-2541)

- Prime Distance Graphs.  
  - Joshua D Laison*, Colin Starr, Willamette University, and Andrea Walker, Sandia National Laboratory (1077-05-124)

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1:30PM Mean value theorems on symmetric spaces.  
Francois Rouviere, Universite de Nice, France (1077-22-456)

2:00PM The cosk-1-transform and intertwining operators for SL(n,F).  
Gestur Olafsson*, Louisiana State University, and Angela Pasquale, University of Metz (1077-43-1085)

3:00PM Twisted Poisson integrals on bounded symmetric domains.  
Adam Koranyi, H. H. Lehman College, CUNY (1077-22-874)

3:30PM Radon transformation on reductive symmetric spaces: support theorems.  
Job J. Kuit, University of Copenaghen (1077-44-456)

4:00PM Range of the Double Fibration Transform (joint work with Michael Eastwood).  
Joseph A. Wolf, University of California at Berkeley (1077-22-331)

5:00PM The bounded hypergeometric functions associated with root systems.  
E. K. Narayanan, Indian Institute of Science, Bangalore, India, Angela Pasquale, Universite Paul Verlaine — Metz, France, and Sanjoy Pusti, University of Luxembourg (1077-33-684)

5:30PM Paley-Wiener Theorems on $R^n$ with respect to the spectral parameter.  
Susanna Dann*, University of Missouri, and Gestur Olafsson, Louisiana State University (1077-43-2720)

1:30PM Rational points on varieties, III  
Jennifer Balakrishnan, Massachusetts Institute of Technology  
Bjorn Poonen, Massachusetts Institute of Technology  
Blanca Viray, Brown University  
Kirsten Wickelgren, Harvard University  
Joshua D Laison*, Colin Starr, Willamette University, and Andrea Walker, Sandia National Laboratory

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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  
Blanca Viray, Brown University  
Kirsten Wickelgren, Harvard University

1:00PM Homotopy Obstructions to Rational Points — I.  
Tomer M. Schlank* and Yonatan Harpaz, The Hebrew University of Jerusalem (1077-14-1374)

1:30PM Homotopy Obstructions to Rational Points — II.  
Yonatan Harpaz* and Tomer M. Schlank, The Hebrew University of Jerusalem (1077-14-1375)

2:00PM Rational points and $\Lambda^1$-homotopy theory.  
Araiva Asok, University of Southern California, and Christian Haesemeyer*, UCLA (1077-14-1226)

2:30PM A p-adic criterion for good reduction of curves over a p-adic field.  
Adrian Iovita, Concordia University, Montreal and Padova University, Italy (1077-14-1616)

3:00PM The birational p-adic section conjecture — revisited.  
Florian Pop, University of Pennsylvania (1077-08-2022)

3:30PM Cohen-Lenstra heuristics and Random Dieudonne Modules.  
David Michael Zureick-Brown* Emory University, Jordan Ellenberg, University of Wisconsin-Madison, and Bryden Cais, The University of Arizona (1077-11-2088)

4:00PM Euclidean quadratic forms and ADC forms.  
Pete L. Clark, University of Georgia (1077-11-2451)

4:30PM Imaginary quadratic class numbers and Sha for congruent number curves.  
Preliminary report.  
Nils Bruin, Simon Fraser University (1077-11-2012)

5:00PM Diophantine Equations With Two Separated Variables.  
Benjamin L Weiss, Technion (1077-12-128)

5:30PM Extensions of a Kim and Roush Result to Algebraic Fields.  
Preliminary report.  
Alexandra Shlapentokh, East Carolina University (1077-11-1325)
AMS Special Session on Some Nonlinear Partial Differential Equations: Theory and Application, III

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
Dispersive Quantization — the Talbot Effect.
Peter J. Olver, University of Minnesota (1077-35-605)

1:30PM
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
Water Waves with Discontinuous Vorticity.
Walter A. Strauss, Brown University (1077-76-1172)

2:30PM
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
Xuesong Wu, Tianjin University, China & Imperial College London, UK (1077-76-2301)

4:00PM
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
Evolution of elastic thin films with curvature regularization via minimizing movements.
Paolo Piovano, Carnegie Mellon University (1077-35-1747)

5:00PM
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

1:00 PM – 5:40 PM Fairfield, 3rd Floor, Marriott

Organizers: Todd Fisher, Brigham Young University
Boris Hasselblatt, Tufts University

1:00PM
Partial Hyperbolicity in the Hamiltonian and geometrical context.
Enrique Pujals, IMPA (1077-37-764)

2:00PM
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
Isotopy class for orbits of skewed \( R \)-covered Anosov flows.
Danijela Damjanovic, Rice University (1077-37-937)

3:00PM
Partially hyperbolic actions on nilmanifolds.

3:30PM
Mixing rates for flows.

4:00PM
Billiards under small twists.

4:30PM
A note on dynamical Borel-Cantelli lemmas for non-uniformly hyperbolic dynamical systems.

5:00PM
Essential coexistence of completely hyperbolic and completely non-hyperbolic behavior.

Yakov B. Pesin, Penn State University (1077-37-540)
### MAA Invited Paper Session on Semidefinite Optimization and Nonnegative Polynomials

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>1:00 PM – 3:45 PM</td>
<td>Room 302, Hynes</td>
</tr>
<tr>
<td>1:00PM</td>
<td>Nonnegative Polynomials and Sums of Squares.</td>
</tr>
<tr>
<td>(1807)</td>
<td>Grigoriy Blekherman, Georgia Tech</td>
</tr>
<tr>
<td>1:45PM</td>
<td>Sum of Squares Optimization applied to Walking Robots and Robotic Birds.</td>
</tr>
<tr>
<td>(1808)</td>
<td>Russ Tedrake, Massachusetts Institute of Technology: Computer Science</td>
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<tr>
<td></td>
<td>and Artificial Intelligence Lab (1077-AH-2831)</td>
</tr>
<tr>
<td>2:30PM</td>
<td>Computational and Algebraic Aspects of Convexity.</td>
</tr>
<tr>
<td>(1809)</td>
<td>Amir Ali Ahmadi, MIT (1077-AH-2925)</td>
</tr>
<tr>
<td>3:15PM</td>
<td>Graphs, Distances, and Semidefinite Programming.</td>
</tr>
<tr>
<td>(1810)</td>
<td>Steven J. Gortler, SEAS, Harvard University (1077-AH-900)</td>
</tr>
</tbody>
</table>

### MAA Minicourse #3: Part B

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>1:00 PM – 3:00 PM</td>
<td>Salon AB, 4th Floor, Marriott</td>
</tr>
<tr>
<td></td>
<td>Problem-based courses for teachers, future teachers, and math majors.</td>
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<tr>
<td></td>
<td>Presenters: Gail Burrill, Michigan State University</td>
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<td></td>
<td>Darryl Yong, Harvey Mudd College</td>
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<td></td>
<td>Bowen Kerins, Education Development Center</td>
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<td></td>
<td>James King, University of Washington</td>
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### MAA Minicourse #7: Part B

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>1:00 PM – 3:00 PM</td>
<td>Salon CD, 4th Floor, Marriott</td>
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<tr>
<td></td>
<td>Study the masters: Using primary historical sources in mathematics teaching.</td>
</tr>
<tr>
<td></td>
<td>Presenters: Daniel Otero, Xavier University</td>
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<td></td>
<td>David Pengelley, New Mexico State University</td>
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### MAA Minicourse #11: Part B

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>1:00 PM – 3:00 PM</td>
<td>Salon HI, 4th Floor, Marriott</td>
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<tr>
<td></td>
<td>Teaching differential equations with modeling.</td>
</tr>
<tr>
<td></td>
<td>Presenters: Michael Huber, Muhlenberg College</td>
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<td></td>
<td>Dan Flath, Macalester College</td>
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<td></td>
<td>Tom LoFaro, Gustavus Adolphus College</td>
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### AMS Session on Combinatorics and Graph Theory, VI

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>1:00 PM – 5:25 PM</td>
<td>Room 111, Hynes</td>
</tr>
<tr>
<td>1:00PM</td>
<td>On the Distribution of Arithmetic Sequences in the 3x + 1 Graph.</td>
</tr>
<tr>
<td>(1811)</td>
<td>Preliminary report.</td>
</tr>
<tr>
<td></td>
<td>Keenan Monks, Harvard, Ken G. Monks*, University of Scranton, Ken M. Monks, Colorado State University, and Maria Monks, UC Berkeley (1077-05-1804)</td>
</tr>
<tr>
<td>1:15PM</td>
<td>Counting Binary Normal Networks.</td>
</tr>
<tr>
<td>(1812)</td>
<td>Devon R Bickner, Iowa State University (1077-05-1719)</td>
</tr>
<tr>
<td>1:30PM</td>
<td>Improving the Computational Efficiency of the Blitzstein–Diaconis algorithm for Generating Graphs of Prescribed Degree.</td>
</tr>
<tr>
<td>(1813)</td>
<td>Elizabeth Moseman, NIST (1077-05-1694)</td>
</tr>
<tr>
<td>1:45PM</td>
<td>Combinatorial Interpretations of Quantum Elementary Characters.</td>
</tr>
<tr>
<td>(1814)</td>
<td>Preliminary report.</td>
</tr>
<tr>
<td></td>
<td>Brittany C Shelton* and Mark Skandera, Lehigh University (1077-05-1664)</td>
</tr>
<tr>
<td>2:00PM</td>
<td>Some planar Hall completable graphs.</td>
</tr>
<tr>
<td>(1815)</td>
<td>Preliminary report.</td>
</tr>
<tr>
<td></td>
<td>Sibel Ozkan, Istanbul, Turkey, and Erik E Westlund*, Kennesaw State University (1077-05-1594)</td>
</tr>
<tr>
<td>2:15PM</td>
<td>The k-Fixed-Endpoint Path Partition Problem.</td>
</tr>
<tr>
<td>(1816)</td>
<td>Breeanne Baker* and Garth Isaak, Lehigh University (1077-05-1568)</td>
</tr>
<tr>
<td>2:30PM</td>
<td>Mod (2p + 1)-orientations in graphs.</td>
</tr>
<tr>
<td>(1817)</td>
<td>Yanting Liang, St. Mary’s College of Maryland (1077-05-1761)</td>
</tr>
<tr>
<td>2:45PM</td>
<td>On quasi-symmetric designs with intersection difference three.</td>
</tr>
<tr>
<td>(1818)</td>
<td>V. C. Mavron, T. P. McDonough, Institute of Mathematics and Physics, Aberystwyth, Ceredigion, UK, and M. S. Shrikhande*, Central Michigan University (1077-05-1852)</td>
</tr>
<tr>
<td>3:00PM</td>
<td>Break.</td>
</tr>
<tr>
<td>3:15PM</td>
<td>Split digraphs.</td>
</tr>
<tr>
<td>(1819)</td>
<td>M Drew LaMar, College of William and Mary (1077-05-1853)</td>
</tr>
<tr>
<td>3:30PM</td>
<td>Maximum packings of complete graphs with stars.</td>
</tr>
<tr>
<td>(1820)</td>
<td>Dan Roberts, Auburn University (1077-05-1457)</td>
</tr>
<tr>
<td>3:45PM</td>
<td>Generalizations of Baranyai’s Theorem and Embedding Factorizations.</td>
</tr>
<tr>
<td>(1821)</td>
<td>Amin Bahmanian, Auburn University (1077-05-1369)</td>
</tr>
<tr>
<td>4:00PM</td>
<td>Conjectures and Results on Equitable Δ-Coloring of Graphs.</td>
</tr>
<tr>
<td>(1822)</td>
<td>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)</td>
</tr>
</tbody>
</table>
4:15 PM Partial Permutations Avoiding Pairs of Patterns.
Noah Arbesfeld, Massachusetts Institute of Technology (1077-05-1300)

4:30 PM Quotients of subgroup lattices of finite abelian $p$-groups. Preliminary report.
Marina Dombrovskaya, Washington University in St. Louis (1077-05-1252)

4:45 PM A Geometric Extremal Result for Cubic Arrays.
James E. Gossell*, University of Central Missouri, and Peter Johnson, Auburn University (1077-05-1639)

5:00 PM A hypergraph version of a graph packing theorem by Bollobás and Eldridge.
Peter Hamburger, Western Kentucky University, Alexandr V. Kostochka, University of Illinois at Urbana-Champaign, and Christopher Stocker*, Western Kentucky University (1077-05-1945)

5:15 PM A bijective factorization of modified Macdonald polynomials.
Nicholas A Loehr, Virginia Tech, and Elizabeth M Niese*, Marshall University (1077-05-1513)

AMS Session on Computer Science, Information, Control Theory, and Economics, II

1:00 PM - 4:55 PM Room 303, Hynes

1:00 PM Numerical Experiments on New Relaxation-Type Algorithms for LPs.
Jesus A. De Loera, Amitabh Basu and Mark J. Junod*, University of California, Davis (1077-90-1418)

Warren P Adams and Frank M Muldoon*, Clemson University (1077-90-1418)

1:30 PM Computational Manifold Equilibrium in Dynamical Economic Models.
Zhengyuan Gao, University of Amsterdam (1077-91-297)

1:45 PM A Minimax Distribution Free Approach: Joint Vendor and Buyer Model.
Ajanta Roy, University of South Carolina, Salk, SC 29488 (1077-91-2528)

2:00 PM Game theory in vaccination and its application. Preliminary report.
Yingyun Shen* and Mike Mesterton-Gibbons, Florida State University (1077-91-2483)

Shaobai Kan, John Jay College of Criminal Justice, CUNY (1077-93-1291)

Liang Hong*, Bradley University, Jyojirinoy Sarkar, Indiana University, Purdue University Indianapolis, and Bruno Bieth, Modeling and Simulation, Novartis Pharma AG (1077-90-16)

2:45 PM Break.

3:00 PM Strategic market games with random endowments.
Barbara A Bennie, University of Wisconsin - La Crosse (1077-91-2382)

3:15 PM (Me) vs (Them) with the Help of Mr. Lincoln.
Allan M. Cordish, Bethel, Ohio (1077-91-2382)

3:30 PM Growth of one-dimensional cellular automata.
Eric Rowland*, LaCIM, Universite du Quebec a Montreal, and Charles Brummitt, University of California Davis (1077-68-130)

3:45 PM Turing Machines and Quantum Computation: Building a Quantum Brain.
Julia T Upton, Husson University (1077-68-127)

4:00 PM Strategies to Deploy Temporary Ambulatory Medical Services in Response of a Catastrophic Event. Preliminary report.
Ahlam E.H. Tannouri*, Morgan State University, Sam F. Tannouri, University of Maryland School of Medicine (1077-90-2907)

4:15 PM Communication-efficient 2-round group key establishment from pairings.
K N Neupane* and R Steinwandt, Florida Atlantic University, Boca Raton, Florida (1077-94-1635)

4:30 PM Controllability of nonlocal semilinear boundary delay control systems. Preliminary report.
Nutan Kumar Tomar* and Suman Kumar, Indian Institute of Technology Patna, Bihar,India (1077-93-2344)

4:45 PM Codes from incidence matrices and line graphs of generalized Paley graphs. Preliminary report.
Pani Seneviratne, American University of Sharjah (1077-94-543)

AMS Session on Group Theory and Generalizations

1:00 PM - 5:40 PM Room 308, Hynes

1:00 PM On subgroups of the Dixmier group and Calogero-Moser spaces. Preliminary report.
Alimjon K Eshmatov, University of Arizona, Tucson (1077-20-2938)
### Program of the Sessions – Boston, MA, Friday, January 6 (cont’d.)

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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>1:15PM</td>
<td>Symmetry of Endomorphism Algebras - Preliminary report. Preliminary report. Adam Anthony Allan, St. Louis University (1077-20-2820)</td>
</tr>
<tr>
<td>1:30PM</td>
<td>The probability that two elements commute in groups with small centers. Preliminary report. Thomas Langley, Rose-Hulman Institute of Technology (1077-20-2585)</td>
</tr>
<tr>
<td>2:00PM</td>
<td>Relating the structure of a group to the module-theoretic properties of the group von Neumann algebra over the complex group ring. Wade Mattox, Virginia Tech (1077-20-2491)</td>
</tr>
<tr>
<td>2:15PM</td>
<td>Recent results on Cayley-Dickson loops. Jenya Kirshtein, University of Denver (1077-20-2154)</td>
</tr>
<tr>
<td>2:30PM</td>
<td>Monoids Defined by Second Order Preliminary report. Trey Brock* and Nicholas R Baeth, University of Central Missouri (1077-20-2054)</td>
</tr>
<tr>
<td>2:45PM</td>
<td>Schur σ-groups of prime power order. Michael R Bush, Smith College (1077-20-1783)</td>
</tr>
<tr>
<td>3:15PM</td>
<td>Break.</td>
</tr>
<tr>
<td>3:30PM</td>
<td>Abelian groups with partial decomposition bases. Preliminary report. Carol Jacoby, Jacoby Consulting, Katrin Leistner, University of Duisburg-Essen, Germany, Peter Loth*, Sacred Heart University, and Lutz Struengmann, University of Duisburg-Essen, Germany (1077-20-1108)</td>
</tr>
<tr>
<td>3:45PM</td>
<td>Bounds and Asymptotics for Various Properties of Numerical Semigroups. Lynnelle L Ye, Stanford University (1077-20-1054)</td>
</tr>
<tr>
<td>4:00PM</td>
<td>Zero-divisor graphs with seven vertices. Preliminary report. Xinyun Zhu, University of Texas of the Permian Basin (1077-20-638)</td>
</tr>
<tr>
<td>4:15PM</td>
<td>Dirichlet-Ford Domains and Arithmetic Reflection Groups. Preliminary report. Grant S Lakeland, University of Texas at Austin (1077-20-446)</td>
</tr>
<tr>
<td>4:30PM</td>
<td>The nonabelian tensor square of nilpotent product of cyclic groups. Preliminary report. Arturo Magidin, University of Louisiana at Lafayette (1077-20-344)</td>
</tr>
<tr>
<td>4:45PM</td>
<td>Using the p-Group Generation Algorithm to Generate Extensions of D₃ by C₃ × C₃ × C₃ₙ₋₃. Preliminary report. Aliza A. Steurer, Dominican University (1077-20-1605)</td>
</tr>
<tr>
<td>5:00PM</td>
<td>On Conditions Relating to Nonsolvability. Michael J. J. Barry, Allegheny College (1077-20-1613)</td>
</tr>
<tr>
<td>5:15PM</td>
<td>Finite Groups with all Subgroups not Permutable. Joseph Kirtland, Marist College (1077-20-266)</td>
</tr>
<tr>
<td>5:30PM</td>
<td>A new distinguished form for 3-braids and its applications to the σ-order on B₃. Preliminary report. Emille Davie Lawrence, University of San Francisco (1077-20-259)</td>
</tr>
</tbody>
</table>

### AMS Session on Mathematical Biology and Related Fields, III

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>1:00 PM</td>
<td>Room 105, Hynes</td>
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<tr>
<td>1:00PM</td>
<td>Reaction-diffusion replicator equation: Stability and asymptotic behavior. Artem S. Novozhilov*, Vladimir P. Posvyanskii and Alexander S. Bratus, Moscow State University (1077-92-829)</td>
</tr>
<tr>
<td>1:15PM</td>
<td>Mathematical Modeling of Competitive Binding on a Microarray. Frank H Lynch* and Thomas Jemielita, Occidental College (1077-92-629)</td>
</tr>
<tr>
<td>1:30PM</td>
<td>A Novel Baysian Change-Point (BCP) Model for Better ChiP-seq Data Analyses. Preliminary report. 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)</td>
</tr>
<tr>
<td>1:45PM</td>
<td>The Number of Multistate Nested Catalyzing Functions. David Murrugarra, Virginia Tech (1077-92-361)</td>
</tr>
<tr>
<td>2:00PM</td>
<td>A discrete model of iron metabolism in lung epithelial cells with fungal challenge. Preliminary report. John Nardini*, North Carolina State University, Kahmya McAlpin, Oakwood University, Leslie Myint, Johns Hopkins University, and Shermita Lee, Virginia Bioinformatics Institute (1077-92-322)</td>
</tr>
</tbody>
</table>
AMS Session on Number Theory, Field Theory, and Polynomials, II

1:00 PM – 5:25 PM Room 305, Hynes

1:00PM Rational Density. Preliminary report.
   ► (1867) Adam C. McDougall* and Nathan Bishop, St. Olaf College (1077-11-1778)

1:15PM Solutions to \( xyz = 1 \) and \( x + y + z = k \) in integers in cubic number fields. Preliminary report.
   ► (1878) Helen G. Grundman*, Bryn Mawr College, and Laura L. Hall-Seelig, Merrimack College (1077-11-1587)

1:30PM Integer solutions to \( xy^2 = 1 \) and \( x + y + z = k \) in number fields of degree at most four. Preliminary report.
   ► (1879) Helen G. Grundman*, Bryn Mawr College, and Laura L. Hall-Seelig*, Merrimack College (1077-11-1588)

1:45PM Robin’s theorem, primes, and a new elementary reformulation of the Riemann Hypothesis.
   ► (1880) 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 On the dimension of algebro-geometric trace codes.
   ► (1881) Pong Le, Niagara University (1077-11-1104)

2:15PM On positive integers dividing the \( n \)th term of an elliptic divisibility sequence.
   ► (1882) Avram M. Gottschlich, Dartmouth College (1077-11-1705)

2:30PM Computing intersections of abelian varieties associated to modular forms.
   ► (1883) Randy J Heaton, Florida State University (1077-11-1414)

2:45PM The inverse Galois problem and minimal ramification over function fields.
   ► (1884) Meghan M De Witt, University of Central Oklahoma (1077-11-1192)

3:00PM Break.

3:15PM Exponential Hensel lifting.
   ► (1885) A Johnston, Johns Hopkins University (EP) (1077-11-1082)

3:30PM \( \ell \)-adic properties of partition functions.
   ► (1886) 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 Divisibility of Eigenforms, and computing a function of the \( j \)-invariant.
   ► (1887) Jeffrey Beyer*, Kevin James and Hui Xue, Clemson University (1077-11-899)

4:00PM Connections between discriminants and the root distribution of polynomials with rational generating functions.
   ► (1888) Khang D. Tran, University of Illinois at Urbana-Champaign (1077-11-687)
Program of the Sessions – Boston, MA, Friday, January 6 (cont’d.)

AMS Session on Numerical Analysis, I

1:00 PM – 4:55 PM Room 209, Hynes

1:00PM (1894) Iteratively Re-weighted Least Squares Methods for Inverse Problems with Sparsity Constraints. Ingrid Daubechies, Duke University, and Sergey Voronin*, Princeton University (1077-65-1626)

1:15PM (1895) A fast numerical solver for the unsteady Oseen problems in rotation form. Jia Liu, University of West Florida (1077-65-2949)

1:30PM (1896) An Adaptive Compact Scheme for the Quenching Solution of Reaction-Diffusion Equations. Matthew A. Beauregard* and Qin Sheng, Baylor University (1077-65-2497)

1:45PM (1897) Spectral Variational Integrators. Preliminary report. James Brian Hall, University of California, San Diego (1077-65-665)

2:00PM (1898) On the construction of optimal piece-wise constant coarse spaces in algebraic multigrid method. James J Brannick, Yao Chen* and Ludmil T Zikatanov, Penn State University (1077-65-2705)


2:45PM (1901) A Non-linear Least Squares Estimator of Bühlmann Credibility. Preliminary report. Jinfeng Wei, Maryville University of St. Louis (1077-65-2692)

3:00PM Break.

3:15PM (1902) Perturbation theory for the approximation of stability spectra by QR methods for products of linear operators on a Hilbert space. M. Badawy* and Erik S. Van Vleck, University of Kansas (1077-65-2444)


3:45PM (1904) Solving Parabolic Type Moving Interface Problems. Xu Zhang* and Tao Lin, Virginia Tech (1077-65-1492)

4:00PM (1905) The Statistical Estimation of Uncertain Parameters in Elliptic PDEs. Hans-Werner van Wyk, Virginia Polytechnic and State University (1077-65-1465)

4:15PM (1906) High Order Compact Reconstruction Scheme with Weighted Essentially Non-Oscillatory Limiting. Debojyoti Ghosh*, University of Maryland, and James D. Baeder, Department of Aerospace Engineering, University of Maryland (1077-65-1385)

4:30PM (1907) Implementing the localized method of approximate particular solutions using a Schultz-Jones-Mayer algorithm. Guangming Yao*, Rowan University, and Joseph Kolibal, University of Southern Mississippi (1077-65-2230)

4:45PM (1908) Galerkin Finite Element Approximations of an Optimal Control Problem for Elliptic PDEs with Random Input Data. Jangwoon Lee*, University of Maryland, 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


1:30PM (1911) New Results for the Leah Cosine Function. Joshua Mann*, Morehouse College, and Ronald E. Mickens, Clark Atlanta University (1077-35-2144)
1:45PM Fundamentals of differential form and boundary value problems for PDEs.
Maxim Zyskin, UTB (1077-35-2694)
2:00PM A Multi-Moment CIP Method for Hyperbolic Equations.
Sarah King, North Carolina State University (NCSU) (1077-35-2535)
Silvia Jiménez* and Bogdan Vernescu, Worcester Polytechnic Institute (1077-35-2723)
2:30PM Break.
2:45PM Analysis of a 2nd Order Differential Equation with Lidstone Boundary Conditions - The Existence of Positive Solutions.
Tuwaner Hudson Lamar, Morehouse College (1077-35-2291)
3:00PM On the Laplacian, and fractional Laplacian, in an Exterior Domain.
Leonardo Kosloff* and Tomas Schonbek, Florida Atlantic University (1077-35-1893)
3:15PM Blow-up of Solutions to Systems of Nonlinear Wave Equations with Interior and Boundary Sources and Damping.
Yanjuan Guo* and Mohammad A. Rammaha, University of Nebraska-Lincoln (1077-35-2275)
Sean A. Colbert-Kelly* and Daniel Phillips, Purdue University (1077-35-2379)
3:45PM On a Variational Approach for Water Waves.
Danut Arama, Loyola University Chicago (1077-35-1646)
4:00PM Global Well Posedness for a System of KDV-TYPE Equations with Quadratic Nonlinearities. Preliminary report.
Gang Wang*, DePaul University, Jerry L Bona, University of Illinois at Chicago, and Jonathan Cohen, DePaul University (1077-35-1279)
Shelly M McGee, University of Findlay (1077-35-2655)
1:00PM Modularized Math Remediation: Implementation and data.
Aaron Wong, Nevada State College (1077-C5-641)
1:20PM Designing Developmental Mathematics for Student Success.
Alvina J. Atkinson*, Barry D. Biddlecomb and D. Natasha Brewley, Georgia Gwinnett College (1077-C5-202)
1:40PM Streamlining Basic Algebra Instruction.
James R. Henderson, University of Pittsburgh at Titusville (1077-C5-163)
2:00PM Factors Related to Using Algebraic Variables to Represent Quantitative Relationships.
Susan S Gray, University of New England, Barbara J Loud, Regis College, and Carole P Sokolowski*, Merrimack College (1077-C5-121)
Sarah Hutcheson Jahn* and Robert J. Krueger, Concordia University, St. Paul (1077-C5-1367)
2:40PM What Can We Do For Amanda?
Preliminary report.
Jesse W Byrne* and Charlotte K Simmons, University of Central Oklahoma (1077-C5-1411)
3:00PM Developmental Mathematics: Try, Try, and Try Again. Preliminary report.
Sarah V. Cook, Washburn University (1077-C5-2583)
3:20PM Energize: Strategies to Keep Students Going and Going.
Carla Rudder, Zayed University Abu Dhabi United Arab Emirates (1077-C5-1527)
3:40PM An Integrated Media Approach to Developmental Mathematics Instruction.
Jan O. Case* and Jessica Bentley, Jacksonville State University (1077-C5-1909)
4:00PM An evaluation of the success of students who transition from a developmental Math Workshop into College Algebra, Trigonometry and Calculus I. Preliminary report.
Jessica Deshler*, Edgar Fuller, Betsy Kuhn, Doug Squire and Vicki Sealey, West Virginia University (1077-C5-2673)
Karoline Auby*, James Sobota and Maighread McHugh, University of Wisconsin-La Crosse (1077-C5-1958)
4:40PM Creating Pathways to Math Success at a Liberal Arts College. Preliminary report.
Maria Belk* and Lauren Rose, Bard College (1077-C5-2834)
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)

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. Alexander G. Atwood, SUNY Suffolk County Community College (1077-E5-907)

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)

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. Cumminskey* 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)

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)
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)

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.
Soufia 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)

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

1:00PM (1964)  Calculus: A Missed Opportunity.
Peter A. Loeb, University of Illinois Champaign-Urbana (1077-N5-407)

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.
Mannmohan Kaur, Benedictine University (1077-N5-2211)

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)

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-PS-2886)

1:20PM Applications of Discrete Wavelets to Stock Price Prediction.
(1974) John C. Merkel, Oglethorpe University (1077-PS-2868)

1:40PM Applications of Wavelets: a sophomore-level seminar course.
(1975) Rachel J. Weir, Allegheny College (1077-PS-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-PS-2808)

(1977) Jeff Zeitler, SUNY Geneseo (1077-PS-1875)

2:40PM Smartphone Sensors and Wavelets.
(1978) Edward F. Aboufadel*, Nathan Marcus, Grand Valley State University, and Sarajane Parsons, Indiana University of Pennsylvania (1077-PS-901)

3:00PM Facial Detection and Recognition Using the Haar Transform in Static Images.
(1979) Joseph Michael Gonzalez, University of South Florida (1077-PS-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-PS-2611)

3:40PM Investigation of Second Generation Wavelets.

4:00PM Smoke Detection in Stationary Video Using Wavelets. Preliminary report.

MAA Session on the Mathematics of Sustainability
1:00PM - 2:55PM 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)

(1984) Ben Fusaro, Florida State University (1077-H5-2896)

(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.

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.

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.

2:30PM Philosophy (but not philosophers) of mathematics does influence mathematical practice. Preliminary report.

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)
<table>
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<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00PM</td>
<td>Modeling Wrist Oscillations Using</td>
<td>Jennifer Beineke, Western New England College, Lynette Boos, Providence College, Aliza Steurer, Dominican University.</td>
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<td></td>
<td>Perturbation Methods, Preliminary report.</td>
<td>Joe Latulippe*, Norwich University, and Randy Sierra, Cal Poly Pomona (1077-VG-1951).</td>
</tr>
<tr>
<td>1:15PM</td>
<td>Development of an Ozone Inhalation Model. Preliminary report.</td>
<td>Andrew Kirby*, University of Wisconsin-Madison, Analise Rodenberg, Lewis &amp; Clark College, Andrew Bernstein, University of Maryland College Park, and Adrian McLean, Fayetteville State University (1077-VG-1195).</td>
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<tr>
<td>2:00PM</td>
<td>The Mechanical Stability of Growing Arteries.</td>
<td>Rebecca M Vandiver, St. Olaf College (1077-VG-2241).</td>
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<tr>
<td>3:00PM</td>
<td>A three-dimensional mathematical and computational model of necrotizing enterocolitis. Preliminary report.</td>
<td>Jared Barber*, Mark Tronzo, University of Pittsburgh, Gilles Clermont, Center for Inflam. 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 Inflam. and Reg. Modeling, McGowan Institute, and Ivan Yotov, University of Pittsburgh (1077-VG-1722).</td>
</tr>
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<td>A mathematical model of drug resistance with infection by health care workers.</td>
<td>Avner Friedman, Mathematical Biosciences Institute/ The Ohio State University, Najat Ziyadi*, Morgan State University, and Khalid Boushaba, Johns Hopkins University (1077-VG-1455).</td>
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<tr>
<td>3:45PM</td>
<td>An improved mathematical model for dose-response of anticancer drug combinations at fixed schedule.</td>
<td>Ardith El-Kareh, University of Arizona, Leslie Jones*, University of Tampa, and Timothy Secomb, University of Arizona (1077-VG-2082).</td>
</tr>
<tr>
<td>4:00PM</td>
<td>Cannibals and Mosquitos: Using a predator-prey epidemic model to search for a Dengue fever reservoir. Preliminary report.</td>
<td>Lee R Gibson*, Indiana University - Southeast, and Mary E Bradley, University of Louisville (1077-VG-2661).</td>
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<tr>
<td>4:15PM</td>
<td>Inferring gang affiliation for violent events with incomplete data.</td>
<td>Rachel Anne Hegemann*, Erik Lewis and Andrea L. Bertozzi, University of California, Los Angeles (1077-VG-2162).</td>
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<tr>
<td>4:45PM</td>
<td>Exploration of Stable Distributions.</td>
<td>Catherine Rose O'Doherty, University of Mary Washington (1077-VG-1988).</td>
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<tr>
<td>5:00PM</td>
<td>Learning in three multi-player auctions.</td>
<td>Delong Meng, Massachusetts Institute of Technology (1077-VG-806).</td>
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<tr>
<td>1:00 PM – 6:25 PM</td>
<td>Room 206, Hynes</td>
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<td>1:00 PM – 2:40 PM</td>
<td>Back Bay Ballroom D, 2nd Floor, Sheraton</td>
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**MAA General Contributed Paper Session: Research in Applied Mathematics, II**

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<tr>
<th>Time</th>
<th>Title</th>
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<tbody>
<tr>
<td>1:00 PM – 2:40 PM</td>
<td>Intermittency and chaos near Hopf bifurcation with broken $O(2) \times O(2)$ symmetry.</td>
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<tr>
<td>1:15 PM – 2:40 PM</td>
<td>Modeling wave velocity and frequency spectra in low-temperature, compressed LJ lattices: HPC simulations, mathematical theory and applications to acoustic metrics.</td>
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<tr>
<td>1:30 PM – 2:40 PM</td>
<td>Effective Acceleration of Gravity due to the Expanding Universe.</td>
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<tr>
<td>1:45 PM – 2:40 PM</td>
<td>Memory Effects for the Heat Conductivity of Random Suspensions of Spheres.</td>
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<tr>
<td>2:00 PM – 3:00 PM</td>
<td>The $l + N$-vortex problem: a study of inviscid and weakly viscous vortex relative equilibria.</td>
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<tr>
<td>2:15 PM – 3:00 PM</td>
<td>The Dynamic Programming Equation for a Deterministic Optimal Control Problem.</td>
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<tr>
<td>2:30 PM – 3:00 PM</td>
<td>Trajectory Controllability of Nonlinear Integro-differential System.</td>
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*Organizers: Jennifer Beineke, Western New England College, Lynette Boos, Providence College, Aliza Steurer, Dominican University*
Spreadsheets, Big Tables, and the Algebra of Associative Arrays.
Jeremy Kepner, MIT Lincoln Laboratory
(1077-05-1447)

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

1:00 PM – 4:20 PM Room 101, Hynes

1:00PM (2034)
Terrence R Blackman, Medgar Evers College, CUNY (1077-11-880)

1:30PM (2035)
Character sums and hyperelliptic curves associated with subsets of finite fields with square order.
Lois Simon, Howard University (1077-11-1516)

2:00PM (2036)
Elements of Tensor Products of Ultrafilters on \( \mathbb{N} \). Preliminary report.
Vitaly Bergelson, Ohio State University, Neil Hindman, Howard University, and Kendall Williams*, United States Military Academy (1077-22-1974)

2:30PM (2037)
Deriving Optimal Composite Scores: Relating Observational/Longitudinal Data with a Primary Endpoint.
Rhonda D Ellis*, Norfolk State University, and Chris Gennings, Virginia Commonwealth University (1077-62-2037)

3:00PM (2038)
Bicircular Matroids with Circuits of at Most Two Sizes.
Torina Deachune Lewis*, Bethune-Cookman University, Talmage James Reid and Laura Sheppardson, The University of Mississippi, Oxford (1077-05-2060)

3:30PM (2039)
Charles N Glover* and Michael O Ball, University of Maryland (1077-90-2182)

4:00PM (2040)
Mathematics You Won’t Sleep on.
Dennis A. Dean II, Boston (1077-92-2576)

MAA Committee on Two-Year Colleges Panel Discussion
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
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 (2041)
Energy Balance Climate Models with Bio-Feedback.
Georg Hetzer, Auburn University (1077-35-734)

2:00PM (2042)
Well-posedness results for a nonlinear Stokes problem arising in Glaciology.
Qingshan Chen, Max Gunzburger and Mauro Perego*, Florida State University (1077-35-2855)

2:30PM (2043)
On the Global Well-posedness of a Simplified Reduced Rayleigh-Bénard Convection Model.
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 (2044)
Lie group analysis - a microscope of physical and engineering sciences.
Ranis N Ibragimov, University of Texas at Brownsville (1077-35-712)

3:30PM (2045)
Zachary M Harrison* and Peter Derek Bradshaw, Arizona State University (1077-VG-2061)

4:00PM (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
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
2:15 PM – 4:00 PM Exeter, 3rd Floor, Sheraton
MAA Presentations by Teaching Award Winners

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.
Cindy Wyels, CSU Channel Islands
(1077-A0-2744)

2:40PM Teaching, Mentoring, and Advising Undergraduate Research: Lessons Learned On the Streets.
Susan Loepp, Williams College
(1077-A0-1847)

3:30PM Learning to teach and teaching to learn.
Preliminary report.
Matthew E DeLong, Taylor University
(1077-A0-2872)

AMS Committee on Science Policy Panel Discussion

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

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
Brynjah Kohler, Utah State University
Roger Knobel, University of Texas Pan American
Glenn Stevens, Boston University

ASL Invited Address

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

3:20 PM – 5:35 PM Room 202, Hynes

Organizer: Amy Shell-Gellasch, Beloit College

Martin E. Flashman, Humboldt State University (1077-E1-707)

3:40PM Torricelli and Robinson play Gabriel’s Trumpet. 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. Preliminary report.
Duane K Farnsworth, Clarion University of Pennsylvania (1077-E1-2668)

Scott B. Guthery, Docent Press (1077-E1-1174)

4:40PM Astronomical Instruments Between Theory and Practice.
Toke L Knudsen, SUNY Oneonta
(1077-E1-592)

5:00PM Euler’s “Letters to a German Princess”:
Translation and Betrayal.
Dominic W Klyve, Central Washington University
(1077-E1-2271)

5:20PM James Hamblin Smith’s Euclid.
Charles F. Rocca, Western Connecticut State University (1077-E1-2935)

MAA Minicourse #5: Part B

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

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
MAA Undergraduate Poster Session

3:30 PM – 5:30 PM Veteran’s Auditorium, 2nd floor, Hynes
Organizer: Joyati Debnath, Winona State University

ASL Contributed Paper Session, I

4:15 PM – 6:15 PM Room 207, Hynes
4:15PM (2059) Martin’s Maximum and Tower Forcing.
Sean Cox, Universität Münster
4:40PM (2060) 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) Jeffry Hirst*, François Dorais and Paul Shafer, Appalachian State University
5:30PM (2062) Complexity in the degrees of unsolvability of mass problems.
Paul Shafer, Appalachian State University
5:55PM (2063) 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

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

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

5:00 PM – 6:15 PM Room 304, Hynes
5:30PM (2064) 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

5:00 PM – 6:00 PM Room 309, Hynes

MAA Actuarial Science Panel Discussion

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

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

5:00 PM – 6:30 PM Room 313, Hynes

SIGMAA on Mathematical and Computational Biology Business Meeting and Guest Lecture

6:00 PM – 7:45 PM Room 202, Hynes
6:00PM Reception and business meeting.
7:00PM (2065) Epidemiology of influenza strains: Competition, prediction, and associated mortality.
Edward Goldstein, Harvard School of Public Health (1077-A0-46)

MAA Dramatic Presentation

6:00 PM – 7:00 PM Room 312, Hynes
Mathematically Bent Theater.
Presenter: Colin Adams, Mobiusbandaid Theater Company

AMS Mathematical Reviews Reception

6:00 PM – 7:00 PM Liberty Ballroom BC, 2nd Floor, Sheraton
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

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  
(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

8:00 AM Math Anxiety: From Teacher to Student.  
(2073) Sian L. Beilock, Chicago, IL (1077-97-762)

8:30 AM Gender Differences in Mathematics: Facts from Recent Data.  
(2074) Janet E. Mertz*, University of Wisconsin – Madison, and Jonathan M. Kane, University of Wisconsin – Whitewater (1077-97-1282)

9:00 AM Girls’ Angle: A Math Club for Girls.  
(2075) C. Kenneth Fan, Girls’ Angle (1077-97-1095)

9:30 AM Progress and Persistent Barriers for Women in Advanced Mathematics.  
(2076) Patricia Hale, Cal Poly Pomona (1077-97-1688)

10:00 AM 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)
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

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 Interesting families of algebraic curves.
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.
Harlan Kadish, Texas A&M University (1077-13-409)

9:00AM Lattice Cryptography and Pseudorandomness.
Daniele Micciancio, UCSD (1077-68-2091)

AMS Special Session on Arithmetic Geometry, III

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.
Pieter Rozenhart, University of Calgary, and Jonathan Webster*, Bates College (1077-11-1566)

8:30AM Conjugacy classes in GSp and an application to the enumeration of abelian surfaces. Preliminary report.
Cassie L Williams, Colorado State University (1077-11-216)

AMS Special Session on Algebraic and Geometric Aspects of Integrable Systems and Random Matrices, III

8:00 AM – 10:40 AM Constitution Ballroom B, 2nd Floor, Sheraton
Organizers:
Anton Dzhamay, University of Northern Colorado
Kenichir Maruno, University of Texas, Pan American
Virgil Pierce, University of Texas, Pan American

8:00AM Integrable n-field model on a triangular domain.
Maxim Zyskin, University of Texas, Brownsville (1077-35-2599)
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 Hrynkiv, University of Houston-Downtown
Suzanne Lenhart, University of Tennessee, Knoxville, and NIMBioS

8:00 AM  Reducing HIV Epidemic by Education and Treating it Using Optimal Control. Preliminary report.
  Hem Raj Joshi, Xavier University, Cincinnati, OH (1077-49-2824)

8:30 AM  Bang-bang Optimal Control of Continuous Time Species Augmentation. Preliminary report.
  Erin N Bodine*, Rhodes College, and Suzanne Lenhart, University of Tennessee, Knoxville (1077-92-1716)

9:00 AM  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)

9:30 AM  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)

10:00 AM  A Local Approach for an Inverse Problem on a Semi-Axis.
  John V Matthews* and Boris Belinsky, University of Tennessee at Chattanooga (1077-35-826)

10:30 AM  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

8:00 AM  Intersection property of fractals via Schmidt games.
  Ryan Broderick, Lior Fishman, Dmitry Kleinbock*, Asaf Reish, Brandeis University, and Barak Weiss, Ben Gurion University (1077-11-1050)

8:30 AM  Hitting Probabilities and Packing
  Bing Li, South China University of Technology, Narn-Rueih Shieh, National Taiwan University, and Yimin Xiao*, Michigan State University (1077-60-1556)

9:00 AM  Lipschitz Equivalence of Cantor Sets.
  Yang Wang, Michigan State University (1077-26-2606)

9:30 AM  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)

10:00 AM  Fractals and hyperbolicity. Preliminary report.
  Vadim Kaimanovich, University of Ottawa (1077-37-2630)

10:30 AM  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. Zhauri Nashed, University of Central Florida
Thomas Sonar, Technical University of Braunschweig

8:00 AM  Multiscale simulations for Richards’ equation in high-contrast media and applications.
  Yalchin Efendiev, Juan Galvis, Seul Kang* and Raycho Lazarov, Texas A&M University (1077-65-1770)

8:30 AM  Stress field simulations in geothermal reservoirs. Preliminary report.
  Matthias Augustin, University of Kaiserslautern (1077-74-1305)

9:00 AM  Recent trends in Multi-parameter Regularization.
  Sergei Pereverzev, Johann Radon Institute, Austrian Academy of Sciences (1077-65-1506)

10:00 AM  Methods for the treatment of indirect noisy data.
  Bernd Hofmann, Chemnitz University of Technology, Germany (1077-65-1314)
10:30 AM – 1:00 AM
Clarendon, 3rd Floor, Marriott

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

8:00 AM Quantum Circuits at Nash Equilibrium.
Faisal Shah Khan* and Simon J. D. Phoenix, Khalifa University
(1077-81-745)

8:30 AM Engineering Pointer States in Open Quantum Systems.
Lorenza Viola, Dartmouth College
(1077-93-1544)

9:00 AM 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)

9:30 AM Stabilization of stochastic quantum dynamics via open and closed loop control.
Francesco Ticozzi, University of Padova and Dartmouth College
(1077-93-619)

10:00 AM Real-time feedback control of a mesoscopic superposition.
Kurt Jacobs*, Justin Finn and Sai Vinjanampathy, University of Massachusetts at Boston
(1077-93-270)

10:30 AM Convergence of quantum random walks with decoherence.
Sheng Xiong*, Edward Waters College, Shimaof 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

8:00 AM 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)

8:30 AM The Inverse Inertia Problem for Graphs.
Wayne Barrett, Provo (1077-15-2757)

9:00 AM 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)

Pauline van den Driessche, University of Victoria, B.C., Canada
(1077-15-908)
**Program of the Sessions – Boston, MA, Saturday, January 7 (cont’d.)**

<table>
<thead>
<tr>
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<td>Quantum Caldero-Chapoton Type Cluster Characters.</td>
<td>Dylan Charles Rupel, University of Oregon (1077-81-2525)</td>
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<td>10:30AM</td>
<td>Proof of a positivity conjecture by M. Kontsevich.</td>
<td>Kyungyong Lee*, Wayne State University, and Ralf Schiffler, University of Connecticut (1077-05-1477)</td>
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<td><strong>AMS Special Session on My Favorite Graph Coloring and Domination Conjectures, I</strong></td>
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<td>8:00 AM</td>
<td>The minimum semidefinite rank of the Heawood graph is 10.</td>
<td>Louis Deaett, Quinnipiac University (1077-15-2809)</td>
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<td>Unordered multiplicity lists of a class of binary trees.</td>
<td>In-Jae Kim*, Minnesota State University, Mankato, and Bryan L Shader, University of Wyoming (1077-15-496)</td>
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<td>8:00 AM</td>
<td>On the nature of mathematical conjecture.</td>
<td>Neil Robertson, Ohio State University, Columbus, and King Abdulaziz University, Jeddah, Saudi Arabia (1077-05-2361)</td>
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<td>Powers of Strong Digraphs.</td>
<td>Ping Zhang, Western Michigan University (1077-05-1217)</td>
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<td>Stephen T. Hedetniemi, Clemson University (1077-05-1740)</td>
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<td>The $\Delta^2$ Conjecture for Graph Labellings with Separation Conditions.</td>
<td>Jerrold R. Griggs, University of South Carolina (1077-05-1128)</td>
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<td>9:00 AM</td>
<td>Two Conjectures Involving Diameter and Total Domination in Graphs.</td>
<td>Teresa W. Haynes, East Tennessee State University (1077-05-2226)</td>
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<td>Some History on the Reconstruction Conjecture.</td>
<td>Allen J. Schwenk, Western Michigan University (1077-05-2021)</td>
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<td><strong>AMS Special Session on Noncommutative Birational Geometry and Cluster Algebras, II</strong></td>
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<td>8:00 AM</td>
<td>Triangular bases in acyclic quantum cluster algebras. Preliminary report.</td>
<td>Andrei Zelevinsky, Northeastern University (1077-13-1577)</td>
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<td>Cluster structures on quantum coordinate ring. Preliminary report.</td>
<td>Christof Geiss*, Universidad Nacional Autonoma de Mexico, Bernard Leclerc, Universite de Caen, and Jan Schroeer, University of Bonn (1077-16-2239)</td>
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<td>Compact differences of composition operators in several variables.</td>
<td>Katherine Heller, North Central College (1077-47-380)</td>
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<td>Closed-Range Composition Operators on Dirichlet type spaces. Preliminary report.</td>
<td>Maria Tjani, University of Arkansas (1077-47-2314)</td>
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<td>Trieu L. Le, University of Toledo (1077-47-2190)</td>
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<td>weighted Bergman spaces.</td>
<td>Brent J Carswell and Rachel J Weir*, Allegheny College (1077-30-328)</td>
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<td>Norm of the multiplication operators from $\mathbb{II}$ to the Bloch Space of a bounded symmetric domain.</td>
<td>Flavia Colonna*, George Mason University, Glenn R. Easley, System Planning Corporation, Arlington, Virginia, and David Singman, George Mason University (1077-47-1313)</td>
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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

8:00 AM (2157) A Refuge-mediated Apparent Competition Model.
Lih-Ing Wu Roeger\textsuperscript{a}, Texas Tech University, and Sze-Bi Hsu, National Tsing Hua University, Taiwan (1077-92-1257)

8:30 AM (2158) Qualitative Assessment of the Roles of an Imperfect Vaccine and Pap Cytology Screening on the Transmission Dynamics of Human Papillomavirus.
M. T. Malik\textsuperscript{a}, 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, É H Elbasha, Merck Research Laboratories, North Wales, PA, USA, and S. M. Mahmoud, Winnipeg Regional Health Authority, Winnipeg, Manitoba (1077-92-332)

9:00 AM (2159) Dispersal in heterogeneous landscape.
Yuan Lou, Ohio State University (1077-92-497)

9:30 AM (2160) Species abundance distributions in a stochastic niche model.
Rosalyn C Rael\textsuperscript{a}, 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)

10:00 AM (2161) Climate-driven dynamics of seasonal influenza in the tropical regions.
Preliminary report.
Maria C.A. Leite\textsuperscript{a}, University of Toledo, Xiamxing Xiao, Deartment of Botany and Microbiology, University of Oklahoma, and Meijun Zhu, University of Oklahoma (1077-34-603)
Azmy S. Ackleh* and Paul Salceanu, University of Louisiana at Lafayette (1077-92-1269)

AMS Special Session on Tensor Categories and Representation Theory, I
8:00 AM – 10:50 AM
Room 103, Hynes
Organizers: Deepak Naidu, Northern Illinois University
Dmitri Nikshych, University of New Hampshire

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)

3-Dimensional Topology and Finite Tensor Categories.
Noah Snyder*, Columbia University, Christopher Douglas, Oxford University, and Christopher Schommer-Pries, MIT (1077-17-390)

AMS Special Session on Theory and Applications of Stochastic Differential and Partial Differential Equations, II
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 Sathananthan, Tennessee State University

Static and Dynamic Features of Liquid Crystal Films.
Lei Z. Cheng, Purdue University (1077-35-938)

Derivation of system of SDEs for simple phylogenetic tree.
Ummugul Bulut* and Edward Allen, Texas Tech University (1077-92-2189)

Existence of solutions for financial models with transaction costs and stochastic volatility.
Indranil SenGupta, University of Texas-El Paso (1077-35-170)

On an equivalence of categories of relative Yetter-Drinfeld modules.
Istvan Heckenberger, Philipps University Marburg (1077-81-984)

Ideals in Deligne’s $Rep(GL_3)$.
Jonny Comes, Lewis and Clark College (1077-18-1607)

Forms of tensor categories over arbitrary fields.
Pavel Etingof*, MIT, and Shlomo Gelaki, Technion - I.I.T, Haifa, Israel (1077-17-1326)

Cohomology of $GL_2(R)$-valued cocycles over hyperbolic systems.
Victoria Sadovskaya, University of South Alabama (1077-37-1258)

AMS Special Session on Uniformly and Partially Hyperbolic Dynamical Systems, III
8:00 AM – 10:40 AM
Fairfield, 3rd Floor, Marriott
Organizers: Todd Fisher, Brigham Young University
Boris Hasselblatt, Tufts University

Invariant Sets of Hyperbolic Toral Automorphisms.
Skyler C Simmons, Brigham Young University (1077-37-1330)

Anosov diffeomorphisms constructed from $\pi_k(Diff(S^n))$.
Tom Farrell and Andrey Gogolev*, SUNY Binghamton (1077-37-944)

Local rigidity for Anosov automorphisms.
Andrey Gogolev, Binghamton University, Boris Kalinin* and Victoria Sadovskaya, University of South Alabama (1077-37-1189)

Cohomology of $GL(2,\mathbb{R})$-valued cocycles over hyperbolic systems.
Victoria Sadovskaya, University of South Alabama (1077-37-1258)

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
8:00 AM – 10:10 AM
Room 308, Hynes
Organizers:Edward Allen, Texas Tech University
Qiang Mu, Harbin Normal University, China (1077-17-1576)

Cartan Type Lie Superalgebra $\tilde{S}(n)$ over a Field of Positive Characteristic.
Qiang Mu, Harbin Normal University, China (1077-17-1576)
8:15 AM – 10:25 AM Room 111, Hynes

8:00 AM Log-concavity of the Partition Function.
  (2187) 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)

8:15 AM Minimum Clique Number, Chromatic Number, and Ramsey Numbers.
  (2188) Gaku Liu, Princeton University (1077-05-1042)

8:30 AM 3-shuffles of permutations. Preliminary report.
  (2189) Camillia Smith Barnes, Sweet Briar College (1077-05-1126)

8:45 AM Codes of compositions.
  (2190) John T. Hird*, Naihuan Jing and Ernest Stitzinger, North Carolina State University (1077-05-989)

9:00 AM Parallel Double Rule Application in Signed Graphs.
  (2191) Margaret M. Meyerhofer, Carnegie Mellon University (1077-05-967)

9:15 AM Combination of ordered trees associated with nonnegative integer sequences.
  (2192) Hana Kim*, Gi-Sang Cheon, Sungkyunkwan University, and L. W. Shapiro, Howard University (1077-05-1811)

9:30 AM h-vectors of small matroid complexes.
  (2193) Jesus A DeLoera, Yvonne Kemper and Steven Klee*, UC Davis (1077-05-997)

9:45 AM Subtraction-Division Games, Patterns, and Self-similarity.
  (2194) Elizabeth J. Kupin, Rutgers University (1077-05-913)

10:00 AM Part Products of Random S-Restricted Compositions.
  (2195) Caroline Shapcott, Drexel University (1077-05-754)

10:15 AM Restricted rooted non-separable planar maps. Preliminary report.
  (2196) 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 Combinatorics and Graph Theory, VII

8:00 AM – 10:25 AM Room 111, Hynes

8:00 AM Equivalent Condition of Primitivity for Semifields.
  (2179) Jinlin Chen* and Minerva Cordero, University of Texas at Arlington (1077-17-1432)

8:30 AM Equivalence Classes of Subquotients of Pseudodifferential Operator Modules on the Line. Preliminary report.
  (2180) Jeannette Mun Larsen, University of North Texas (1077-17-1762)

8:45 AM Maximal weights and multiplicities of certain \( \tilde{s}(n) \)-modules.
  (2181) Rebecca L. Jayne*, Washington College, and Kailash C. Misra, North Carolina State University (1077-17-63)

9:00 AM Ring maps, derived categories, and the Bousfield Lattice.
  (2182) Luke Wolcott, University of Washington (1077-18-893)

9:15 AM Coherence of canonically-defined natural transformations in the derived category of \( \hat{l}\)-adic sheaves.
  (2183) Ryan Cohen Reich, UCLA (1077-18-2289)

9:30 AM The stable derived category of a polynomial ring in two variables modulo the quadratic forms. Preliminary report.
  (2184) Daniel A. Bravo Vivallo, University of Southern Maine (1077-18-1623)

9:45 AM The projective stable derived category of a ring. Preliminary report.
  (2185) James Gillespie, Ramapo College (1077-18-1656)

10:00 AM Finite generation of the cohomology of subquotients of a PBW algebra.
  (2186) Piyush Ravindra Shroff, Texas A&M University (1077-18-1052)

AMS Session on Geometry and Differential Geometry, II

8:00 AM – 9:40 AM Room 105, Hynes

8:00 AM Ford Circles and Spheres. Preliminary report.
  (2197) Sam Northshield, SUNY-Plattsburgh (1077-51-2722)

8:15 AM The \( \text{Kähler-Ricci} \) flow, the \( \text{Mabuchi metric} \), and the existence of \( \text{Kähler-Einstein} \) metrics.
  (2198) Donovan C. McFeron, Ramapo College of New Jersey (1077-53-149)

8:30 AM Curve Matching via Discrete Invariants.
  (2199) Preliminary report.

8:45 AM Metric Fibrations from Simply Connected Rank - One Projective Spaces. Preliminary report.
  (2200) Richard H. Escobales, Jr., Canisius College (1077-53-1365)

9:00 AM Rectifying Viviani curves. Preliminary report.
  (2201) Scott J Simmons, Drury University (1077-53-1756)

9:15 AM A Model Category Structure on Smooth Spaces.
  (2202) Dan Christensen and Enxin Wu*, the University of Western Ontario (1077-53-2470)
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
<th>Affiliation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30AM</td>
<td>An example of a wild geometric structure. Preliminary report.</td>
<td>Stanislav Dubrovskiy*, MSRI, and Mikhail Shubin, Northeastern University</td>
<td>(1077-53-2596)</td>
</tr>
<tr>
<td>8:00 AM – 9:40 AM</td>
<td><strong>AMS Session on Mathematical Logic, and Ordered and General Algebraic Structures</strong></td>
<td></td>
<td><strong>Room 209, Hynes</strong></td>
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<tr>
<td>8:00AM</td>
<td>A logical analysis of the Monty Hall problem.</td>
<td>Allen L. Mann, Colgate University</td>
<td>(1077-03-1980)</td>
</tr>
<tr>
<td>8:15AM</td>
<td>Beatty Sequences and Exponential Complexity Issues. Preliminary report.</td>
<td>Iraj Kalantari and Mojtaba Moniri*, Western Illinois University</td>
<td>(1077-03-2911)</td>
</tr>
<tr>
<td>8:30AM</td>
<td>Nilpotence in Groups with Bounded Chains of Centralizers.</td>
<td>Paul Baginski*, Smith College, and Tuna Altinel, Universite Lyon 1</td>
<td>(1077-03-2750)</td>
</tr>
<tr>
<td>8:45AM</td>
<td>Finding Factors of Factor Rings over the Eisenstein integers. Preliminary report.</td>
<td>Valmir Bucaj, Texas Lutheran University</td>
<td>(1077-08-382)</td>
</tr>
<tr>
<td>9:00AM</td>
<td>The Order Dimension and Coloring of Planar Point Sets.</td>
<td>Jonathan E Beagley, George Mason University</td>
<td>(1077-06-1035)</td>
</tr>
<tr>
<td>9:30AM</td>
<td>The Algebraic Lattice of Algebraic Closure Operators.</td>
<td>Martha Lee Hollist Kilpack, Binghamton University</td>
<td>(1077-11-96)</td>
</tr>
<tr>
<td>8:00 AM – 9:40 AM</td>
<td><strong>AMS Session on Number Theory, Field Theory, and Polynomials, III</strong></td>
<td></td>
<td><strong>Room 305, Hynes</strong></td>
</tr>
<tr>
<td>8:00AM</td>
<td>Dihedral $p$-adic fields.</td>
<td>Chad Awtrey, Elon University</td>
<td>(1077-11-1766)</td>
</tr>
<tr>
<td>8:15AM</td>
<td>Selectivity in Quaternion Algebras.</td>
<td>Benjamin Linowitz, Dartmouth College</td>
<td>(1077-11-533)</td>
</tr>
<tr>
<td>8:30AM</td>
<td>Symbolic evaluation of log-sine integrals in polylogarithmic terms.</td>
<td>Jonathan M. Borwein, University of Newcastle, NSW Australia, and Armin Straub*.</td>
<td>(1077-11-487)</td>
</tr>
<tr>
<td>9:00AM</td>
<td>A Set of Quadratic Equations For Factoring or Primality Determination of odd $6^n + 1$ Type Odd Integers.</td>
<td>L J Balasundaram, Cambridge, Massachusetts</td>
<td>(1077-11-96)</td>
</tr>
<tr>
<td>9:30AM</td>
<td>Making imprimitive characters behave primitively.</td>
<td>Ryan C Daileda*, Trinity University, and Nathan C Jones, University of Mississippi</td>
<td>(1077-11-2476)</td>
</tr>
<tr>
<td>8:00 AM – 9:55 AM</td>
<td><strong>AMS Session on Partial Differential Equations, II</strong></td>
<td></td>
<td><strong>Room 110, Hynes</strong></td>
</tr>
<tr>
<td>8:00AM</td>
<td>Slow Drift and Fast Asynchronous Oscillatory Instabilities of Spike Patterns in a One-Dimensional Singularly Perturbed Brusselator Model.</td>
<td>Justin C Tsou*, Northwestern University, Yana Nec and Michael J Ward, University of British Columbia</td>
<td>(1077-35-1151)</td>
</tr>
<tr>
<td>9:00AM</td>
<td>The 2D Boussinesq equations with partial viscous dissipation.</td>
<td>Dhanapati Adhikari*, Marywood University, and Jiahong Wu, Oklahoma State University</td>
<td>(1077-35-2232)</td>
</tr>
<tr>
<td>9:15AM</td>
<td>The Nonlinear Klein-Gordon Equation and Average Variational Principle.</td>
<td>Lokenath Debnath, The University of Texas - Pan American</td>
<td>(1077-35-927)</td>
</tr>
<tr>
<td>9:30AM</td>
<td>Extended fifth-order KdV type equations.</td>
<td></td>
<td>(1077-35-106)</td>
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<tr>
<td>9:45AM</td>
<td>Nonlinear multi-integrable couplings with Hamiltonian structures.</td>
<td>Wen-Xiu Ma, University of South Florida</td>
<td>(1077-35-604)</td>
</tr>
</tbody>
</table>
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

8:00 AM (2226)
Implications for learning transition level mathematics using a distance delivery model. Preliminary report.
Ronald L Merritt, Athens State University (1077-OS-94)

8:20 AM (2227)
An Analysis of 4 College Algebra Classes With or Without Computer Software Support.
Bonnie L. Oppenheimer, Mississippi University for Women (1077-OS-195)

8:40 AM (2228)
On Synchronous Distance Teaching in a Mathematics MS Program. Preliminary report.
Kuiyuan Li*, Raid Amin and Josphat Uvah, University of West Florida (1077-OS-231)

9:00 AM (2229)
Students’ Attitude Toward Assessment of online Learning of College Algebra and Intermediate Algebra.
A. S. Elkhader, Northern State University (1077-OS-350)

9:20 AM (2230)
Exploring the Effect of Using Technology on the online Learning of Algebra.
Bashar Zogheib, American University of Kuwait (1077-OS-1167)

9:40 AM (2231)
Expanding Redesign Success. Preliminary report.
Elizabeth A Eagle, University of North Carolina at Charlotte, NC (UNCC) (1077-OS-2122)

10:00 AM (2232)
Teaching a General Education Math Course Online with Discussion boards and a Screencast system.
James Baglama, University of Rhode Island (1077-OS-2044)

10:20 AM (2233)
On WebWork: how to Design a Model Course that is Concise and Complete? Preliminary report.
Shumei C Richman, Columbia, SC (1077-OS-1914)

10:40 AM (2234)
Online PREP Workshops: The experience of teaching online professional development courses in mathematics.
Mike May, Saint Louis University (1077-OS-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

8:00 AM (2235)
The History of Irrational and Transcendental Numbers; Classroom Benefits.
Charlie L Smith, Park University (1077-E1-2677)

8:20 AM (2236)
Dick Jardine, Keene State College (1077-E1-2008)

8:40 AM (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)

9:00 AM (2238)
Mayan Geometry in the Classroom. Preliminary report.
Cynthia J. Woodburn, University of California, Santa Barbara (1077-E1-441)

9:20 AM (2239)
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)

9:40 AM (2240)
Could they have known it generalized? Preliminary report.
Steven R Benson, Lesley University (1077-E1-2233)

10:00 AM (2241)
Putting Mathematics Education Controversies in Historical Context.
H. Smith Risser, Montana Tech (1077-E1-2108)

10:20 AM (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)

10:40 AM (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  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-FS-979)

8:20AM  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-FS-222)

8:40AM  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-FS-2914)

9:00AM  Using Experience from the Past to Move Forward to the Common Core State Standards.
Elizabeth C. Rogers, Piedmont College (1077-FS-2908)

9:20AM  Advanced Teacher Capacity in Mathematics and the Common Core.
Gregory D Foley, Ohio University (1077-FS-2643)

9:40AM  Enhancing the content knowledge of pre-service secondary mathematics teachers: Understanding connections.
Yating Liu, The Ohio State University (1077-FS-2087)

10:00AM 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-FS-2050)

10:20AM  Developing Teachers’ Flexibility in Geometry: Addressing the CCSS Mathematics Objectives.
Tanya Berezovski, St. Joseph’s University, Philadelphia, PA (1077-FS-859)

10:40AM  Updating the CBMS report on the mathematical education of teachers and the Common Core.
William McCallum, The University of Arizona (1077-FS-2955)

MAA General Contributed Paper Session: Assorted Topics, I

8:00 AM – 10:55 AM  Room 201, Hynes
Organizers: Jennifer Beineke, Western New England College
Lynette Boos, Providence College
Aliza Steurer, Dominican University

8:00AM  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)

8:15AM  Exposed and strongly exposed points in symmetric spaces of measurable operators.
Malgorzata M Czerwinska, University of Mississippi (1077-VL-2545)

8:30AM  Apriori bounds and maximum principles for some higher order nonlinear pdes.
Anita Marenco, Penn State Harrisburg (1077-VL-392)

8:45AM  “Resistance” is Futile: Understanding the Effect of Resistance in Physical Systems.
Perry Y.C. Lee, Kutztown University of Pennsylvania (1077-VL-1892)

9:00AM  What Does the Normality Test Indicate About the Coverage Probability of the One Sample t-based Confidence Interval?
Daniel J. Ghezzi, King’s College, Wilkes-Barre, Pa. (1077-VL-1997)

9:15AM  Modeling Examination scores with the Wakeby Distribution.
Bernard Beecher, Bmcc/CUNY-The City University of New York (1077-VL-1947)

9:30AM  Jensen’s Inequality Versus Algebra in Finding the Exact Maximum.
Mohammad K Azarian, University of Evansville (1077-VL-610)

9:45AM  Asymptotic Behavior of some Strödl Polynomials.
Timothy B. Flowers, Indiana University of Pennsylvania (1077-VL-2411)

10:00AM  Wilf’s conjecture.
Tewodros Amdeberhan, Tulane University, Valerio De Angelis*, Xavier University of Louisiana, and Victor Moll, Tulane University (1077-VL-2526)

Steve Rhine and Colin Starr*, Willamette University (1077-VL-2001)

10:30AM  What Does the Normality Test Indicate About the Coverage Probability of the One Sample t-based Confidence Interval?
Daniel J. Ghezzi, King’s College, Wilkes-Barre, Pa. (1077-VL-1997)

10:45AM  Communication: The Success to Online Courses. Preliminary report.
Edward D. Smith, Pima Community College (1077-VL-2921)
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

8:00 AM (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)

8:15 AM (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)

8:30 AM (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)

8:45 AM (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)

9:00 AM (2269)
Status, Interaction, and Undergraduate Mathematics in Nigeria: A VLP Experience.
Martha Byrne, University of New Mexico (1077-VL-346)

9:15 AM (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)

9:30 AM (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)

9:45 AM (2272)
Heather A. Bulen, Kristi L. Haik and Gail Mackin*, Northern Kentucky University (1077-VL-492)

10:00 AM (2273)
Recruitment and Retention of First Generation Mathematics Majors.
Elizabeth K. Mauch, Bloomsburg University of Pennsylvania (1077-VL-500)

10:15 AM (2274)
"Leading Disadvantaged Students to Success in Mathematics" —- A midterm report of our S-STEM funded project.
Preliminary report.

10:30 AM (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)

10:45 AM (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

8:00 AM (2277)
Finite Type Knot Invariants. Preliminary report.
Lena Folwaczny, University of Illinois, Chicago (1077-VL-2832)

8:15 AM (2278)
The Coefficient Space of Polynomial Knots.
Lee Stemkoski, Adelphi University (1077-VL-2199)

8:30 AM (2279)
Adding Complexity to Playing Tic-Tac-Toe. Preliminary report.
Mary J. Riegel, University of Montana (1077-VL-2664)

8:45 AM (2280)
On global invariants of fibrations of smooth complete intersections.
James A. Fullwood, Florida State University (1077-VL-2579)

9:00 AM (2281)
Regular Graded Skew Clifford Algebras of Low Global Dimension.
Manizheh Nafari, University of Texas at Arlington (1077-VL-2505)

9:15 AM (2282)
Global Weyl modules for twisted loop algebras.
Nathaniel J. Manning*, University of California, Riverside, Ghislain Fourier, Mathematisches Institut, Universität zu Köln, Germany, and Prasad Senesi, The Catholic University of America (1077-VL-2133)
Program of the Sessions – Boston, MA, Saturday, January 7 (cont’d.)

9:30AM (2283) BGG reciprocity for the current algebra of sl_{r+1}.
Matthew L. Bennett*, Nathaniel J. Manning and Vyjayanthi Chari,
University of California, Riverside (1077-VJ-2118)

9:45AM (2284) On Fourier-Mukai type functors.
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) Lusztig-Schnirlemann Category and the connectivity of X.
Nicholas A Scoville, Ursinus College (1077-VJ-2933)

MAA General Contributed Paper Session: Research in Graph Theory and Combinatorics

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-2386)

8:30AM (2291) Cops and Robber on the hypercube.
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)

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)

Daniel P. Biebighauser, Concordia College, Moorhead, MN (1077-VJ-1695)

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) 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 Stufflebeam, 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)

SIAM Minisymposium on Recent Advances in Fluid Dynamics and Turbulence Models

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) Dissipative Nonlocal Operators and Applications: SQG.
Peter Constantin*, Princeton University, and Vlad Vicol, The University of Chicago (1077-35-2324)
**Global wellposedness of 2D anisotropic Boussinesq equations.**
Chongsheng Cao*, Florida International University, and Jiahong Wu, Oklahoma State University (1077-35-1904)

**Ensemble Dynamics and Bred Vectors.**
Anna L Mazzucato, Pennsylvania State University (1077-37-1552)

**Pressure Beneath a Stokes Wave.**
Walter A Strauss, Brown University (1077-76-1170)

**MAA General Contributed Paper Session: Assorted Topics, III**

**A Student Inspired Capstone Experience.**
Preliminary report.
Elyn Rykken, Muhlenberg College (1077-VL-2695)

**Creating a Meaningful Mock Classroom Experience for Pre-Service Secondary Teachers.**
Preliminary report.
Becky E Hall, Western Connecticut State University (1077-VL-2278)

**How I Taught A Course About The History Of Mathematics For The First Time.**
Ricardo Enrique Rojas, Northern State University, Aberdeen, South Dakota. (1077-VL-1668)

**An Overview of Numerical Systems.**
Preliminary report.
Walter S. Sizer, Minnesota State University Moorhead (1077-VL-340)

**Red, White, and Blue: Pythagorean Triples in Undergraduate Mathematics Teaching.**
Preliminary report.
Homero W. Austin*, Salisbury University, and Jathan W. Austin, University of Delaware (1077-VL-1377)

**Deciphering a Message Using the Vigenère Square.**
Preliminary report.
Bill Linderman, King College (1077-VL-1724)

**Benjamin Franklin’s Magic.**
Preliminary report.
Rebecca Garcia, Sam Houston State University (1077-VL-2879)

**Combinatorial Proofs of Fibonacci Identities by Means of the Path Graph.**
Preliminary report.
John T. Jacobson, Kennesaw State University (1077-VL-842)

**Domination and Independence on the Triangular Honeycomb Chessboard.**
Preliminary report.
Hong Lien T. Tran, Kennesaw State University (1077-VL-846)

**Tiling Deficient Chessboards with \(n\)-Polyominoes.**
Kristina J Woodside, Washington and Jefferson College (1077-VL-2396)

**Counting Liars and Truth-tellers: Binomial Identities through Logic Puzzles.**
Oscar Levin, University of Northern Colorado (1077-VL-2402)

**AWM Workshop**

**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.
Program of the Sessions – Boston, MA, Saturday, January 7 (cont’d.)

9:00AM Initial boundary value problem for coupled nonlinear dispersive equations. Preliminary report. Gene Wayne, Boston University

9:15AM Existence and stability of steady states of the reaction-diffusion equations in a spatially continuous domain. Martin Golubitsky, University of Houston

9:30AM History of Computation as a Professional Development Course for Middle School Teachers. Todd H. Moore, Hillside High School, Mankato, Minnesota

10:00AM 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

10:15AM Mathematical Thinking: Can we ever agree on a definition? A conceptual meta-analysis. Sean F Argyle, Kent State University

10:30AM Geometric constructions using a finite compass and a finite straightedge. David S Richeson, Dickinson College

10:45AM Best Web sites for the history of mathematics. Paul R. Bialek, Trinity International University

MAA Invited Paper Session on Applications of Dynamical Systems

8:30 AM – 10:50 AM Room 302, Hynes

Organizer: Gene Wayne, Boston University

8:30AM Chaos, Complex Dynamics, and Undergraduate Research Projects. Robert L. Devaney, Boston University

9:00AM Patterns of Oscillation in Network Systems. Martin Golubitsky, Mathematical Biosciences Institute, Ohio State University

9:30AM A Dynamical Systems Approach to Paleoclimate Models. Richard McGehee, University of Minnesota, Minneapolis, Minnesota

10:00AM Lagrangian Dynamics and the incorporation of data into ocean models. Christopher K R T Jones, University of North Carolina at Chapel Hill

10:30AM Snakes and ladders. Bjorn Sandstede, Brown University

MAA General Contributed Paper Session: History and Philosophy of Mathematics

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 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

8:45AM History of Computation as a Professional Development Course for Middle School Teachers. Todd H. Moore, Andrew G. Bennett* and Carlos W. Castillo-Garsow, Kansas State University

9:00AM 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

9:15AM Mathematical Thinking: Can we ever agree on a definition? A conceptual meta-analysis. Sean F Argyle, Kent State University

9:30AM Geometric constructions using a finite compass and a finite straightedge. David S Richeson, Dickinson College

9:45AM Best Web sites for the history of mathematics. Paul R. Bialek, Trinity International University

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

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 On Legendrian Graphs. Danielle O'Donnol, Smith College, and Elena Pavlescu*, Occidental College

9:00AM Springer's representation via sl(3) webs. Heather M. Russell*, University of Southern California, Julianna S. Tymoczko, University of Iowa, and Matthew Housley, BYU

9:30AM Categorification of the polynomial ring. Radmila Sazdanovic*, University of Pennsylvania, and Mikhail Khovanov, Columbia University

10:00AM Promotion and rowmotion. Jessica Striker* and Nathan Williams, University of Minnesota
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


9:00AM ▶ (2344) Quantitative Literacy in a First-Year Seminar Course. Preliminary report. Maria G Fung, Worcester State University (1077-J1-1973)


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 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
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
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
### NAM Panel Discussion
9:00 AM – 9:50 AM Room 101, Hynes
Title to be announced.

### Student Hospitality/Information Center
9:00 AM – 2:00 PM 2nd Floor Corridor by Veterans Auditorium, Hynes

### Exhibits and Book Sales
9:00 AM – NOON Exhibit Hall D, Hynes

### Employment Center
9:00 AM – NOON Exhibit Hall C, Hynes

### MAA General Contributed Paper Session: Assorted Topics, IV
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
  Wasin So, San Jose State University (1077-VL-531)
10:15AM
- What can a right triangle look like? Preliminary report.
  Steven Schlicker, Grand Valley State University (1077-VL-1348)
10:30AM
  Salvatore Giunta, Adelphi University (1077-VL-2185)

### ASL Contributed Paper Session, II
10:00 AM – 10:45 AM Room 207, Hynes
10:00AM
- Forking in VC-minimal theories. Preliminary report.
  Sarah Cotter*, Sarah Starchenko, University of Notre Dame (1077-VL-351)
10:25AM
- Indiscernible sequences and simplicity. Preliminary report.
  Donald Brower, University of Notre Dame (1077-VL-1348)

### SIGMAA on Math Circles Demonstration for Undergraduate Students
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
10:00 AM – 10:50 AM Room 101, Hynes

### MAA Invited Address
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
10:30 AM – 11:00 AM Room 306, Hynes
10:30AM
- An alternative approach to hyperbolic structures on link complements. Preliminary report.
  Morwen Thistlethwaite and Anastasiia Tsvietkova*, University of Tennessee, Knoxville (1077-57-134)
10:30AM
  Megan Patnott, University of Notre Dame (1077-14-197)
10:30AM
- Reflection groups: Comparing length and codimension. Preliminary report.
  Briana Foster-Greenwood, University of North Texas (1077-05-211)
10:30AM
  Hui Li, University of Minnesota (1077-74-230)
10:30AM
- Sum-list-coloring and sc-greedy graphs. Preliminary report.
  Michelle A. Lastrina, Iowa State University (1077-05-232)
10:30AM
- Splittings of Non-Finitely Generated Groups. Preliminary report.
  Robin M. Lassonde, University of Michigan (1077-20-249)
10:30AM
- Equivalence and Duality for Rank-Metric and Matrix Codes.
  Katherine Morrison, University of Nebraska – Lincoln (1077-94-257)
10:30AM
- 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
- 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)
10:30AM – 5:50PM Back Bay Ballroom

Students in Post-Baccalaureate Programs, IV
in Mathematics by Undergraduates and
AMS-MAA-SIAM Special Session on Research
10:30AM – 1:50PM Room 101, Hynes

AMS Business Meeting

11:10 AM – 11:40 AM Ballrooms A/B, 3rd floor, Hynes

Chair: Paul Zorn, Saint Olaf College

AMS Business Meeting

11:45 AM – 12:15 PM Ballrooms A/B, 3rd floor, Hynes

NAM Claytor-Woodard Lecture

1:00 PM – 1:50 PM Room 101, Hynes

(2370) Profinite (Continuous) Equivariant Higher
Algebraic K-theory for the Action of
Algebraic Groups.
Aderemi Oluymi 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

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.
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.
Oksana Bihun, Austin Bren*, Michael
Dyrud and Kristin Heyssie, Concordia
College, MN (1077-65-105)

2:00PM Folded ribbon knots in the plane.
Preliminary report.
Eleanor Conley*, Emily Meehan,
Elizabeth Deine and Rebecca Terry,
Smith College (1077-51-1889)

2:30PM The Life and Death of a Geodesic.
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.
Preliminary report.
James Cameron*, Charles Daly and
Padmanabhan Seshaiyer, George Mason
University (1077-35-1902)

3:30PM Statistical functional equations in the
plane.
Mary Michael Forrester, Sewanee: The
University of the South (1077-39-1087)

4:00PM Constructing the Moduli Space of
(2377) 2/2-Dimensional Complex Associative
Algebras.
Josh Frink, University of Wisconsin-Eau
Claire (1077-00-2734)

4:30PM Optimal Harvesting Models for Fishery
Populations. Preliminary report.
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.
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.
Preliminary report.
Krishna Dasaratha, Harvard University,
Laure Flapan, Yale University, Chansoo
Lee*, Williams College, Cornelia
Mihaila, 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

1:00 PM – 5:50 PM Room 109, Hynes

Organizers: Ram U. Verma, Texas A&M
University
Alexander J. Zaslavski,
Technion, Israel
1:00PM
The \( \epsilon \) – Optimality conditions for
Multiobjective Fractional Programming Problems.
R. N. Mohapatra*, University of Central
Florida, Orlando, Florida, and Ram U
Verma, Texas A & M University,
Kingsville, Texas (1077-49-223)

1:30PM
Stochastic differential equations on
Banach spaces and optimization of
supports of measures induced.
Nasir U. Ahmed, University of Ottawa
(1077-93-62)

2:00PM
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
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
Quantum Games & Quaternionic
Strategies.
Aden Omar Ahmed, Texas A&M
University - Kingsville (1077-49-323)

3:30PM
Higher-Order Necessary Conditions
in Nonsmooth Set Constrained
Optimization.
Elena Constantin, University of
Pittsburgh-Johnstown (1077-49-178)

4:00PM
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
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
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
The Weak Optimality Conditions
for Multiple Objective Fractional
Programming Based on Generalized
Inexity 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
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
On the Modified Nonlinear Schrödinger
Equation in the Semiclassical Limit.
Peter D. Miller, University of Michigan
(1077-35-1187)

2:30PM
Prym–Tyurin classes and tau-functions.
Dmitry Korotkin, Concordia University
(1077-51-315)

3:30PM
Higher genus Weierstrass
sigma-function.
Dmitry Korotkin, Concordia University,
and Vasilisa Shramchenko*, University
of Sherbrooke (1077-33-1046)

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 Hrynkiv, University of
Houston-Downtown
Suzanne Lenhart, University
of Tennessee, Knoxville, and
NIMBioS

1:00PM
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
Optimal Control of Advection Direction
on Reaction-Diffusion Population Models.
Heather Finotti, Suzanne Lenhart
and Tuoc Van Phan*, University of
Tennessee (1077-35-987)
2:00 PM – 5:50 PM Room 200, Hynes

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

1:00 PM – 5:50 PM

Boston, MA, Saturday, January 7 – Program of the Sessions

Room 200, Hynes

Optimal control of a biharmonic obstacle problem.
David R. Adams, University of Kentucky, Volodymyr Hryniv*, University of Houston-Downtown, and Suzanne Lenhart, University of Tennessee-Knoxville (1077-49-2081)

Mosquito Management in the face of Natural Selection. Preliminary report.
Folashade B. Agusto*, Austin Peay State University, Sharon Bewick, National Institute for Mathematical and Biological Synthesis, and Rana D Parshad, Center for Turbulence Research, Stanford University, (1077-92-2287)

Influence of Model Structure on Control of a Cholera Epidemic. Preliminary report.
Elsa N Schaefer, Marymount University (1077-93-2069)

Optimal Control Applied to Native-Invasive Species Competition via a PDE Model.
Wandi Ding*, Middle Tennessee State University, Volodymyr Hryniv, University of Houston - Downtown, and Xiaoyu Mu, University of Tennessee - Knoxville (1077-49-341)

Modelling effective transmission strategies and control of the world’s most successful parasite.
Matthew D Turner, University of Tennessee-Knoxville (1077-92-1919)

Peng Zhong*, Department of Ecology, Evolution, and Natural Resources, Rutgers University, and Suzanne Lenhart, University of Tennessee, Knoxville (1077-92-1781)

A Vegetative Pattern Formation Aridity Classification Scheme Along a Rainfall Gradient: An Example of Desertification Control.
Bonni J Kealy* and David J Wollkind, Washington State University (1077-92-146)

Hopf and backward bifurcations in a new model for the dynamics of malaria transmission.
Calistus Ngeh Ngonghala, National Institute for Mathematical and Biological Synthesis (NIMBioS) (1077-92-2663)

1:00 PM – 5:50 PM

AMS Special Session on Frontiers in Geomathematics, IV

1:00 PM – 5:50 PM Suffolk, 3rd Floor, Marriott

Organizers: Michael L. Lapidus, University of California, Riverside
Erin Pearse, University of Oklahoma

Organizers: Willi Freeden, University of Kaiserslautern
Volker Michel, University of Siegen
Program of the Sessions – Boston, MA, Saturday, January 7 (cont’d.)

**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 (2424) **Number Theoretic Properties of Difference Equations Associated to Hénon Maps.** Preliminary report.
Joseph H. Silverman, Brown University (1077-37-174)

1:30PM (2425) **Patterns of boundedness for systems of rational difference equations.**
Gerry Ladas, University of Rhode Island (1077-39-1633)

2:00PM (2426) Systems of rational difference equations from population dynamics and global dynamics on the boundary of the positive cone. Preliminary report.
Jim M. Cushing, University of Arizona (1077-39-1925)

2:30PM (2427) Constant Proportion Harvest Policy, Predator Saturation and Mating Limitation Induced Allee Effects In Pacific Halibut and Atlantic Cod Fisheries.
Abdul-Aziz Yakubu* and Nianpeng Li, Howard University (1077-92-2159)

3:00PM (2428) Chaos in expansive rank-type equations. Preliminary report.
Timothy Sauer, George Mason University (1077-39-1999)


4:00PM (2430) When does local stability imply global stability in planar competition models? Saber N Elaydi*, Trinity University, and Rafael Luis, Technical University of Lisbon (1077-39-1237)


5:00PM (2432) Spectral parameter power series for Sturm-Liouville problems on time scales. Preliminary report.
Lynn Erbe, Raziye Mert and Allan Peterson*, University of Nebraska-Lincoln (1077-39-788)

5:30PM (2433) Representations and Ostrowski type inequalities on Time scales. Preliminary report.
George A Anastassiou, University of Memphis (1077-39-360)

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 (2434) A general bar-cobar duality. Preliminary report.
André Joyal* and Matthieu Anel, UQAM, Montréal (1077-18-2785)
1:30PM  Localization and completion with respect to topological Quillen homology.
        John E Harper, University of Western Ontario (1077-55-1672)

2:00PM  Cell complexes and inductive definitions.
        Michael A Shulman, University of California, San Diego (1077-55-875)

2:30PM  Non-realizable 2-stage II-algebras.
        Martin Frankland, University of Illinois at Urbana-Champaign (1077-55-1731)

3:00PM  Stable homotopy 1-types and symmetric Picard groups. Preliminary report.
        Angelica M. Osorno*, University of Chicago, and Niles Johnson, University of Georgia (1077-55-2644)

3:30PM  Obstruction theory for $E_{22}$ maps. Preliminary report.
        Niles Johnson*, University of Georgia, and Justin Noel*, Max Planck Institute and University of Bonn (1077-55-2103)

4:00PM  Truncated Brown-Peterson spectra.
        Tyler Lawson*, University of Minnesota, and Niko Naumann, Universität Regensburg (1077-55-1363)

4:30PM  Higher Geometry and Algebraic K-theory.
        John A. Lind, The Johns Hopkins University (1077-55-1371)

5:00PM  $K$-homology and index theory : Beyond ellipticity.
        Paul Frank Baum, Penn State University (1077-19-403)

5:30PM  Discussion

AMS Special Session on Mathematical Principles and Theories of Integrable Systems

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.
        Gino Biondini*, State University of New York at Buffalo, and Gregor Kovacic, Rensselaer Polytechnic Institute (1077-35-1093)

1:30PM  Multipeaks in the Degasperis-Procesi Equation I. Preliminary report.
        Jacek Szmigielski, University of Saskatchewan, Saskatoon, SK, Canada (1077-35-1160)

2:00PM  Wronskian and Pfaffian solutions to nonlinear partial differential equations.
        Alrazi M Abdeljabbar, University of South Florida (1077-35-1055)

2:30PM  Constructing Integrable Systems From Graded Classical $r$-Matrices. Preliminary report.
        Peter Fedak, Harvey Mudd College, Gizem Karaali*, Keith McHugh, Pomona College, Aaron Pribadi, Harvey Mudd College, and Sundee Sampath, Claremont Graduate University (1077-17-120)

3:00PM  Painleve integrability of coupled variable coefficient higher-order nonlinear Schrodinger equations with free parameters. Preliminary report.
        Zhenyun Qin*, Fudan University, Wenxiu Ma, University of South Florida, and Hong Cal Ma, Donghua University (1077-03-1219)

3:30PM  Hirota Bilinear Equations and their Integrability.
        Connection with Linear Superposition Principle. Preliminary report.
        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.
        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.
        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.
        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.
        Magdy G. Asaad, Tampa (1077-35-1442)

AMS Special Session on Mathematical Theory of Control of Quantum Systems, II

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?
        Herschel Rabitz, Princeton University (1077-81-1511)
1:30PM
Gradient flow in quantum control problems and the role of singular controls.
Ruixing Long, Department of Chemistry, Princeton University (1077-49-680)

2:00PM
Indirect controllability of quantum systems; General Lie algebraic conditions and some special cases.
Domenico D’Alessandro*, Iowa State University, and Raffaele Romano, Department of Physics, Universita’ di Trieste, Italy (1077-93-624)

2:30PM
Symmetry Principles in Quantum Systems Theory with Applications in Simulation and Control.
Thomas Schulte-Herbrueggen, TU-Munich (TUM) (1077-49-349)

3:00PM
Control by quantum dynamics on graphs.
Charles (Chip) E. Lawrence*, Brown University, Donglai Wei, Department of Computer Science, MIT, and Lauren Alpert, Brown University (1077-92-673)

3:30PM
Inferring transcriptional and microRNA-mediated regulatory programs in glioblastoma.
Christina S Leslie, Memorial Sloan-Kettering Cancer Center (1077-92-2283)

4:00PM
Noise Attenuation in Biological Systems.
Qing Nie, University of California, Irvine (1077-92-335)

4:30PM
Darwin, Development and Dysplasia: Signalling Games that Cells Play.
Bud Mishra, Courant Institute (1077-92-1975)

5:00PM
Siphons in Chemical Reaction Networks.
Anne Shiu, University of Chicago, and Bernd Sturmfels*, UC Berkeley (1077-92-36)

1:30PM
Combining simplified Markov random fields with simulated evolution improves remote homology detection for beta-structural proteins into the twilight zone. Preliminary report.
Noah M. Daniels, Lenore J. Cowen*, Tufts University, Raghavendra Hosur and Bonnie Berger, Massachusetts Institute of Technology (1077-92-835)

2:00PM
Predicting RNA Secondary Structural Ensembles of Unaligned Sequences.
Charles (Chip) E. Lawrence*, Brown University, Donglai Wei, Department of Computer Science, MIT, and Lauren Alpert, Brown University (1077-92-673)

4:00PM
Theory and experiments in molecular systems biology.
Eduardo Sontag, Rutgers University (1077-92-484)

5:00PM
Siphons in Chemical Reaction Networks.
Anne Shiu, University of Chicago, and Bernd Sturmfels*, UC Berkeley (1077-92-36)
1:30PM Bipartiteness and the Signless Laplacian Matrix of a Graph.
   Shaun M Fallat, University of Regina (1077-15-950)

2:00PM On the Extremal Energy of Integral Weighted Graphs.
   Richard A Brualdi*, University of Wisconsin, Madison, Jia-ju 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 Eventually r-cyclic matrices.
   Ulrica Wilson*, Morehouse College, and Leslie Hogben, Iowa State University (1077-15-2574)

3:00PM 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 Nilpotent and spectrally arbitrary matrix patterns over C.
   Natalie Campbell, Kevin N. Vander Meulen*, Redeemer University College, and Adam van Tuyl*, Lakehead University (1077-15-137)

4:00PM 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 2-Matching covered loopy graphs.
   Adam H. Berliner*, St. Olaf College, and Richard A. Brualdi, University of Wisconsin - Madison (1077-05-1429)

5:00PM Average mixing on graphs. Preliminary report.
   Chris Godsil, University of Waterloo (1077-05-737)

5:30PM An open problem concerned with the combinatorial structure of unitary matrices.
   Simone Severini, University College London (1077-05-2642)

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 Stasheff polytopes and the coordinate ring of the cluster X-variety of type An.
   Linhui Shen, Yale University (1077-14-1735)

1:30PM 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 Institute of Theoretical Physics, Russian Academy of Sciences,Moscow (1077-16-1502)

2:00PM 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)
1:00 PM – 3:50 PM  Room 300, Hynes

Organizers: Zhonhai Ding, University of Nevada, Las Vegas
Zhaozheng Feng, University of Texas-Pan American

1:00 PM  Boundary Control of the Korteweg-de Vries Equation.
Bingyu Zhang* and Ivonne Rivas, University of Cincinnati (1077-93-631)

1:30 PM  On one dimensional nonlinear equations with negative exponents.
Jingbo Dou, University of Oklahoma, and Xi'an University of Finance and Economics, and Meijun Zhu*, University of Oklahoma (1077-35-1327)

2:00 PM  Remarks on Computing the Williamson Normal Form.
Viswanath Ramakrishna, University of Texas at Dallas (1077-81-870)

2:30 PM  Stripes Versus Spots in Reaction-Diffusion Systems: Comparison of Vegetative and Chemical Turing Pattern Formation.
Bonni J Kealy* and David J Wollkind, Washington State University (1077-92-431)

3:00 PM  Approximation techniques for traveling waves of a single species delay diffusive model with age-structure and nonlocality. Preliminary report.
Majid Bani-Yaghoub, Texas A & M University (1077-41-1427)

3:30 PM  Lie symmetries to the parabolic system.
Zhaozheng Feng, University of Texas-Pan American (1077-35-1713)

AMS Special Session on Nonlinear Analysis of Partial Differential Equation Models in Biology and Chemical Physics, II

AMS Special Session on Operator Theory on Analytic Function Spaces, II

1:00 PM – 5:50 PM  Room 104, Hynes

Organizers: Jens Christensen, University of Maryland
Fulton Gonzalez, Tufts University
Todd Quinto, Tufts University

1:00 PM  Decomposition of spaces of distributions using Gårding vectors.
Jens Gerlach Christensen, Tufts University (1077-43-1820)

3:30 PM  Penrose transforms between symmetric spaces. Preliminary report.
Hideko Sekiguchi, The University of Tokyo (1077-22-2432)
AMS Special Session on Reaction Diffusion Equations and Applications, III

2:00PM Cusp forms for semisimple symmetric spaces. Preliminary report.
Erik P. van den Ban, Utrecht University (1077-22-1515)

3:00PM On multilinear generalized Radon transforms.
Allan Greenleaf, Alex Iosevich and Eyvindur Ari Palsson*, University of Rochester (1077-42-1441)

3:30PM On the associated cycle of $(g, K)$-modules for $g_c = sp (p, q)$ or $so^*(2n)$.
Leticia I Barchini, Oklahoma State University (1077-22-1640)

4:00PM Segal-Bargmann transforms: Old and new. Preliminary report.
Bent Orsted, Aarhus University, Denmark (1077-22-1388)

5:00PM Cusp Forms on hyperbolic spaces.
Nils Byrial Andersen, University of Copenhagen, Denmark. (1077-44-1319)

5:30PM Discussion

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

1:00PM – 5:50PM 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 Multiple Solitary Wave Solutions of Nonlinear Schrödinger Systems.
Rushun Tian* and Zhi-Qiang Wang, Utah State University (1077-35-1771)

1:30PM 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 (1077-35-5338)

2:00PM B0 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)

N. Mavinga*, Swarthmore College, M. N. Nkashama, University of Alabama at Birmingham, and S. Robinson, Wake Forest University (1077-35-2245)

3:00PM 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 On Radial Solutions of certain Nonlinear Elliptic PDE’s.
Florin Catrina, St. John’s University (1077-35-502)

4:00PM 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)

Linlin Su* and Roger Lui, Worcester Polytechnic Institute (1077-35-1996)

5:00PM 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 Three solutions theorem for p-Laplacian boundary value problems.
Chan-Gyun Kim, College of William and Mary (1077-34-1096)
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.
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 (1077-08-1780)

1:30PM (2551) Teaching with ‘Weather in a Tank’.
John Marshall, Massachusetts Institute of Technology (1077-17-777)

2:00PM (2552) A Model Hierarchy for Undergraduate Education in Radiative and Convective Heat Transfer.
Kerry A Emanuel, Massachusetts Institute of Technology (1077-18-1282)

2:30PM (2553) Exploring Sustainability in a Developmental-Level Mathematics Course.
Rikki B. Wagstrom, Metropolitan State University (1077-18-1687)

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 (1077-18-2788)

3:30PM (2555) Environmental Mathematics in a First Year Program. Preliminary report.
John B Little, College of the Holy Cross (1077-18-1825)
Mathematical Modeling and Public Policy
Decisions Aimed at Mitigating Climate Change.
Frank Wattenberg, United States Military Academy (1077-AE-1822)

Short Term (Non-Asymptotic) Linear Stability of Ecosystems: The Role of Non-Self-Adjointness in Homogeneous and Heterogeneous Agricultural Systems.
Gidon Eshel*, Bard College, Andrew Ma, Univ. of Wisconsin, and Olivia Romeo, Bates College (1077-AE-703)

MAA Minicourse #2: Part B
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 B
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 B
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 Topology
1:00 PM – 5:10 PM Room 303, Hynes

1:00PM (2558) Some relations in the cohomology of classifying spaces of manifold bundles. Ilya Grigoriev, Stanford University (1077-55-2916)
1:15PM (2559) Homotopy Kac-Moody groups and infinite pseudoreflection groups. Preliminary report. John D. Foley, University of California-San Diego (1077-55-2649)
1:30PM (2560) What is the algebraic structure of topological manifolds? Preliminary report. Nathaniel Rounds, Indiana University (1077-55-2465)
2:00PM (2562) Homological stability properties of spaces of rational J-holomorphic curves in $\mathbb{C}P^2$. Jeremy Kenneth Miller, Stanford University (1077-55-1775)
2:15PM (2563) Embedding, sectioning and compression of thickenings. Mokhtar Aouina, Jackson State University (1077-55-2294)
2:30PM (2564) The Anodyne Theorem in Model Category Theory. David T Oury, Saint Louis University (1077-55-2376)
2:45PM (2565) Applications of computational homology and cohomology theory. Preliminary report. Pawel Dlotko, Institute of Computer Science, Jagiellonian University in Krakow, Poland (1077-55-2362)
3:00PM Break.
3:15PM (2566) Structured Orientations of Thom Spectra. Greg Chadwick, Indiana University (1077-55-416)
3:30PM (2567) An Algebraic Proof of the Equivalence of Two Quantum 3-Manifold Invariants: The Hennings Invariant and the Kuperberg Invariant. Matt Sequin, The Ohio State University (1077-55-2594)
3:45PM (2568) Generalizing Penner’s Asymptotics For Minimal Dilatation Pseudo-Anosov Mapping Classes. Aaron David Valdivia, Florida State University (1077-55-1412)
4:00PM (2569) The Milnor fiber associated to parallel connections of hyperplane arrangements. Preliminary report. Kristopher Williams, Doane College (1077-55-1321)
4:15PM (2570) Proof of Edwards-Walsh resolution theorem without Edwards-Walsh complexes. Vera Tonic, Nipissing University, North Bay, ON, Canada (1077-55-675)
4:30PM (2571) On Kawachi’s 4-moves Question. Noureen Khan, University of North Texas at Dallas (1077-55-313)
4:45PM (2572) The homotopy limit problem in stable representation theory. Daniel A. Ramras, New Mexico State University (1077-55-215)
5:00PM (2573) A new algorithm for the Multivariable Alexander Polynomial of a Link. K. Grace Kennedy, University of California, Santa Barbara (1077-54-1433)
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.
Galina Dafni, Concordia University, Canada, and Hong Yue*, Trine University, USA (1077-42-2086)

1:15PM (2575) Finite Biorbogonal Transforms and Multiresolution Analyses on Intervals.
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 Youmhi, Saint Francis University (1077-43-2331)

2:00PM (2578) Symmetric Spaces: Mean Value Solutions.
Fulton Gonzalez, Tufts University (1077-43-2549)

2:15PM (2579) Existence of p-Flows in $\mathbb{Z}^n$ and $T_4^d$.
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.
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.
Vignon S Oussa, University of Central Oklahoma / American Academy of Sciences (1077-05-725)

Keith Ouellette, UCLA Extension (1077-22-2489)

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.
Luis Alberto Lomeli, Purdue University (1077-22-135)

4:00PM (2585) Self-dual representations with vectors fixed under an Iwahori subgroup.
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)

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)

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)

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)

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)
AMS Session on Dynamic Systems and Ergodic Theory

1:00 PM – 4:40 PM  Republic Ballroom  A, 2nd Floor, Sheraton

1:00 PM  A dynamical systems analysis of afferent control in a neuromechanical model of locomotion.
Lucy E. Spardy*, University of Pittsburgh, Sergey N. Markin, Natalia A. Shvetsova, 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)

1:15 PM  Ambiguous shifts: symbolic dynamics from open covers.
David Richeson, Dickinson College, and Jim Wiseman*, Agnes Scott College (1077-37-2518)

1:30 PM  Kleinian Limit Sets in Hilbert Space.
Tushar Das, University of North Texas (UNT) (1077-37-2302)

1:45 PM  Gibbs states for non-irreducible countable Markov shifts. Preliminary report.
Eugen Andrei Ghenciu*, East Central University, and Mario Roy, York University (1077-37-2029)

2:00 PM  Uncovering the Lagrangian from observations of trajectories. Preliminary report.
Yakov I Berchenko-Kogan, Massachusetts Institute of Technology (1077-37-2183)

2:15 PM  Speedups of ergodic actions.
Aimee S.A. McClendon*, Swarthmore College (1077-37-2936)

2:30 PM  Perturbations in the Quadratic Family with Multiple Poles.
Elizabeth D Russell, US Military Academy (West Point) (1077-37-1964)

2:45 PM  Break.

3:00 PM  A Mathematical Model of the Unfolded Protein Response to Stress in the Endoplasmic Reticulum of Mammalian Cells.
Danilo Diedrichs, University of Iowa (1077-37-2010)

3:15 PM  Predicting Catastrophes In Dynamical Systems Using Machine Learning.
Jesse Berwald*, College of William and Mary, Tomas Gedeon and John Sheppard, Montana State University (1077-37-1598)

3:30 PM  Dynamics of random selfmaps of surfaces with boundary and graphs.
P. Christopher Staecker, Fairfield University (1077-37-2029)

3:45 PM  Global Asymptotic Stability in a Model of Biological Networks.
Hassan M Fathallah-Shaykh* and Abraham Freiji, The University of Alabama at Birmingham (1077-37-1549)

4:00 PM  Reinventing the Wheel: The Chaotic Sandwheel. Preliminary report.
Anthony Tongen*, Roger J. Thelwell, James Madison University, and David Becerra-Alonso, ETEA - University of Cordoba (1077-37-2527)

4:15 PM  Limit Cycles, Bistability, and Global Stability by Two-Element Negative Loops in Biological Networks.
Abraham Freiji* and Hassan M Fathallah-Shaykh, The University of Alabama at Birmingham (1077-37-1545)
### AMS Session on Functional Analysis and Operator Theory, III

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Author(s)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00PM</td>
<td>Cyclicity of vectors inducing an orbit with a non-zero limit point.</td>
<td>Irina Seceleanu, Bridgewater State University (1077-44-1933)</td>
<td>Room 208, Hynes</td>
</tr>
<tr>
<td>1:30PM</td>
<td>Algebraic Elements and Invariant Subspaces.</td>
<td>Yun-Su Kim, Toledo, OH (1077-47-2234)</td>
<td>Room 208, Hynes</td>
</tr>
<tr>
<td>1:45PM</td>
<td>On Random Fields and Their Wavelet Transforms.</td>
<td>George K. Yang, Tennessee State University (1077-44-1933)</td>
<td>Room 208, Hynes</td>
</tr>
<tr>
<td>2:00PM</td>
<td>Compact Weighted Composition Operators on Bergman Spaces.</td>
<td>Waleed K. Al-Rawashdeh, Montana Tech of The university of Montana (1077-47-1648)</td>
<td>Room 208, Hynes</td>
</tr>
<tr>
<td>2:15PM</td>
<td>The many faces of linear chaos.</td>
<td>Preliminary report.</td>
<td>Room 208, Hynes</td>
</tr>
<tr>
<td>2:30PM</td>
<td>Convergence of the spherical averages for Markov semigroups on operator algebras.</td>
<td>Gabriel T Prajitura, SUNY Brockport (1077-47-1434)</td>
<td>Room 208, Hynes</td>
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<tr>
<td>2:45PM</td>
<td>Break.</td>
<td></td>
<td>Room 208, Hynes</td>
</tr>
<tr>
<td>3:00PM</td>
<td>Feynman's Operational Calculi: Using Cauchy's Integral Formula.</td>
<td>Lance Nielsen, Creighton University (1077-44-1773)</td>
<td>Room 208, Hynes</td>
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<tr>
<td>3:15PM</td>
<td>Rank one unitary perturbations via the theory of dilations.</td>
<td>Constanze Liaw* and Ronald G. Douglas, Texas A&amp;M University (1077-47-495)</td>
<td>Room 208, Hynes</td>
</tr>
<tr>
<td>3:30PM</td>
<td>Equations involving pseudomonotone mappings with respect to two Banach spaces.</td>
<td>Dan D. Pascali, Courant Institute, New York University (1077-47-436)</td>
<td>Room 208, Hynes</td>
</tr>
</tbody>
</table>
AMS Session on Numerical Analysis, II

1:00 PM – 4:55 PM  Room 209, Hynes

3:45PM  A Class of Multidimensional Repeated-root Cyclic Codes.
Edgar Martinez-Moro, Universidad de Valladolid, Soria, Spain, Hakan Ozadam, Ohio University, Ferruh Ozbudak, Universiteler Mah. Dumlupinar, Ankara, Turkey, and Steve Szabo*, Eastern Kentucky University (1077-12-833)

4:00PM  Linear Algebraic Groups as Parameterized Picard-Vessiot Galois Groups.
Michael F. Singer, North Carolina State University (1077-12-833)

4:15PM  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  Number of solutions in nonnegative integers x and y to the generalized Pillai equation \( x^a - y^b = c \). Preliminary report.
Robert A. Styer, Villanova University (1077-11-1786)

4:45PM  Measuring Security.
Daniel C. Smith, National Institute of Standards and Technology (1077-12-289)

AMS Session on Undergraduate Research, VI

1:00 PM – 3:55 PM  Room 308, Hynes

1:00PM  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)

2:00PM  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  A Preconditioned LSQR Algorithm.
James Baglama and Daniel Richmond*, University of Rhode Island (1077-65-1355)

2:30PM  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  On the Numerical Solution of One Nonlinear Parabolic Equation.
Mikheil Tuterbidze, Illa State University (1077-65-480)

3:00PM  Break.

3:15PM  Time-splitting scheme for nonhydrostatic atmospheric model.
Andrei Bourchtein* and Ludmila Bourchtein, Pelotas State University, Brazil (1077-65-1814)

Daniel Peach*, Bates College, Ilse Ipsen, Thomas Wentworth, North Carolina State University, and Colin Gray, University of Evansville (1077-65-2124)

3:45PM  Robust rational interpolation and least-squares.
Lloyd N. Trefethen, Oxford University Mathematical Institute (1077-65-2441)

4:00PM  Spectral Methods For The Nonlinear Hamiltonian Systems.
Nairat Kanyamee, Silpakorn University (1077-65-2595)

4:15PM  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  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  An analytic function without radial boundary values.
J. Marshall Ash, DePaul University (1077-30-1942)
1:15PM  Finger Motion Modeling for Bionic Fingers. Preliminary report.
Myrielle N Allen-Prince*, Bennett College, and Jay Walton, Texas A&M University (1077-92-1324)

1:30PM  A Reservoir Model of Chagas Disease.
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.
Katie Storey*, Carleton College, May Boggess and Jay Walton, Texas A&M University (1077-92-1946)

2:00PM  An Analysis of the Coexistence of Three Competing Species with a Shared Pathogen.
Vrushali A. Bokil and Margaret-Rose W. Leung*, Oregon State University (1077-92-1758)

Samantha Monatra*, 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.
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.
Tucker Gilman, Tony Jhwueng, 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 $SO(3)$.
Eric B Auld, Arizona State University (1077-93-2922)

3:30PM  An Extension of the Fundamental Theorem of Calculus. Preliminary report.
Zengxiang Tong* and Zhen Huang, Otterbein University (1077-97-1080)

3:45PM  Teacher Change in the Context of a Proof-Centered Professional Development.
Osvaldo Daniel Soto, University of California at San Diego (1077-97-2781)

1:00PM ~ 4:55 PM  MAA Session on Innovations in Teaching Statistics in the New Decade, II
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.
Todd Swanson* and Jill VanderStoep, Hope College (1077-ES-2338)

1:20PM  From Tactile to Computer Simulation: An Intermediate Activity to Increase Understanding of Sampling Distributions. Preliminary report.
Sean D Simpson*, Westchester Community College, Stacey Hancock, Clark University, Jennifer Noll, Portland State University, and Aaron Weinberg, Ithaca College (1077-ES-2468)

1:40PM  Using Alternative Forced Choice Models to Introduce the Concepts of Statistical Inference.
Christopher John Malone*, Tisha Hooks and April Kerby, Winona State University (1077-ES-2007)

2:00PM  Engaging Students in Reasoning About the Logic of Hypothesis Testing.
Christina Erbacher* and Hollylynne Stohl Lee, North Carolina State University (1077-ES-1353)

2:20PM  Engaging Adult Learners in the Application of Statistical Processes to Solve Real World Problems.
Michael D. Miner, American Public University (1077-ES-2567)

2:40PM  Teaching the Test.
John D. McKenzie*, Babson College (1077-ES-2763)

3:00PM  Statistics and the (Post-) Millennial Student.
Patricia B Humphrey, Georgia Southern University (1077-ES-2317)

Magdalena Luca, Massachusetts College of Pharmacy and Health Sciences (1077-ES-2074)

3:40PM  Teaching an effective multi-section elementary statistics course. Preliminary report.
Katarzyna Kowal, Ramapo College of New Jersey (1077-ES-1234)

4:00PM  Introducing Sampling Distributions and Hypothesis Testing using Hands-On Simulations and Student Response Technology.
Chris Oehrlein, Oklahoma City Community College (1077-ES-2429)
Milo Schield, Statistical Literacy Project (1077-E5-2503)

4:40 PM  (2684)  A Statistical Odyssey: Modernizing the Discussion Board to Enhance Student Engagement. Preliminary report.  
Kimberly J Presser, Shippensburg University (1077-E5-1341)

MAA Session on Trends in Teaching Mathematics Online, II

1:00 PM - 5:55 PM  Room 311, Hynes

Organizer:  Michael B. Scott, California State University, Monterey Bay

1:00PM  (2685)  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  (2686)  Using SmartPens to Facilitate Math Communication Online.  
Katrina M Palmer, Appalachian State University (1077-O5-210)

1:40PM  (2687)  Increasing interaction in online courses.  
Revathi Narasimhan, Kean University (1077-O5-404)

2:00PM  (2688)  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)

Cheryl E Crowe, Eastern Kentucky University (1077-O5-577)

2:40PM  (2690)  Gluing together Blackboard, Facebook, and Twitter.  
Matthew Leingang, New York University (1077-O5-841)

3:00PM  (2691)  Improving Pedagogy Through Adaptive Problem Selection in Online Tutors.  
Douglas B. Meade*, University of South Carolina, and Philip B. Yasskin, Texas A&M University (1077-O5-1158)

3:20PM  (2692)  “Eluminate-ing” Online Course Meetings.  
Sarah L Mabrouk, Framingham State University (1077-O5-2912)

3:40PM  (2693)  Designing, Developing and Assessing an Online Mathematics Course. Preliminary report.  
Ahlam E.H. Tannouri, Morgan State University (1077-O5-2887)

4:00PM  (2694)  High Touch to High Tech: Distance Learning in a Small Liberal Arts College.  
Ellen Cunningham, Saint Mary-of-the-Woods College (1077-O5-2536)

4:20PM  (2695)  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)

Kyle Siegrist*, University of Alabama in Huntsville, Ivo Dinov, University of California, Los Angeles, and Dennis Pearl, The Ohio State University (1077-O5-2544)

5:00PM  (2697)  The Instructor’s Perspective: How to Make Learning Mathematics an Interactive Experience in an Online Environment.  
Aimee J Ellington, Virginia Commonwealth University (1077-O5-2472)

5:20PM  (2698)  Teaching Python In One Browser Window.  
Graeme Kemkes, Ryerson University, and David Pritchard*, University of Waterloo (1077-O5-2391)

5:40PM  (2699)  Differential Equations Course. Preliminary report.  
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

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  (2700)  Designing Professional Development around the CCSS Standards for Mathematical Practice: A Mathematician-Teacher Collaboration.  
Juliana V. Belding, Harvard University (1077-F5-2746)

1:20PM  (2701)  The Standards for Mathematical Practice: Principles Guiding Pre-service Preparation and In-service Professional Development. Preliminary report.  
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.)


2:00PM  ▶ (2703) Professional Development for Grades K-8 Mathematics Coaches. Elizabeth A. Burroughs, Montana State University (1077-FS-1012)

2:20PM  ▶ (2704) Early Implementation of CCSS via Standards for Mathematical Practice. Davida D Fischman, CSU San Bernardino (1077-FS-795)

SIAM Minisymposium on Variational and PDE Methods in Imaging Science

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)


3:30PM  ▶ (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)


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)

SIGMAA on Math Circles for Students and Teachers Poster and Activity Sessions

Room E, 4th Floor, Marriott

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  ▶ (2715) Rolling Dice; Slide Rules Rule; Tiling Torment; Six Choose Three.

1:30PM  ▶ (2716) Math Education Perspective on Math Circles; Drawing Pictures: How Projective Geometry Was Discovered; Symmetries of the Trihexaflexagon; Making Change for a Dollar.

2:00PM  ▶ (2717) Math Education Perspective on Math Circles; Excel vs. Fibonacci; Slide Rules Rule; 3x3 Magic Squares.

2:30PM  ▶ (2718) Rolling Dice; Peering Through Tubes; Symmetries of the Trihexaflexagon; The Handshake Problem.

3:00PM  ▶ (2719) Excel vs. Fibonacci; Tiling Torment; The Handshake Problem; Making Change for a Dollar.

3:30PM  ▶ (2720) 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 A fast iterative Toeplitz solver.
(2715) Preliminary report.
Joseph Kolibal* and Eowyn Cenek, The University of Southern Mississippi (1077-15-2225)

1:30PM Clustering edges and vertices using fuzzy logic, case study: news documents.
(2716) Walid Sharabati, Purdue University (1077-15-2926)

1:45PM Variations of orbit reflexivity for matrices.
Ileana Ionascu, Philadelphia University (1077-15-2917)

2:00PM Enumerating Invariant Subspaces of \( R^n \).
(2718) Joshua Ide* and Lenny Jones, Shippensburg University (1077-15-2250)

2:15PM Identifying a Basis in a Frame.
(2719) Dominic Kramer, Iowa State University (1077-15-2067)

2:30PM Lower Rank Approximation: A Generalization of Schmidt-Mirsky Theorem and Algorithms.
Yang Liu, College of William & Mary (1077-15-1806)

2:45PM A characterization of Leonard pairs using the parameters \( \{a_i\}_{i=0}^n \).
Edward D. Hanson, University of Wisconsin-Madison (1077-15-2602)

3:00PM Break.

3:15PM The algebraic connectivity of graphs as a function of genus.
Jason J Molitierno, Sacred Heart University (1077-15-1548)

3:30PM Positive Semidefinite Zero Forcing.
(2723) Preliminary report.
Travis A. Peters, Iowa State University (1077-15-1387)

AMS Session on Partial Differential Equations, III

1:15 PM – 4:10 PM  Room 110, Hynes

(2729) Joseph L. Shomberg*, Providence College, and Sergio Frigeri, University of Pavia (1077-35-853)

1:30PM Explicit Flow Equations and Recursion Operator of the ncKP hierarchy.
(2730) Jinsong He, Ningbo University, Junyi Tu*, U of South Florida, Xiaodong Li, China, and Lihong Wang, Ningbo University (1077-35-856)

1:45PM Dynamics of single species influenced by age-dependent dispersal and maturation time delay. Preliminary report.
(2731) Majid Bani-Yaghoub, Texas A & M University (1077-35-465)

2:00PM An inverse electromagnetic scattering problem for cavity.
(2732) Fang Zeng*, Jiguang Sun, Delaware State University, and Fioralba Cakoni, University of Delaware (1077-35-1111)

2:15PM Sign-changing solutions of the semilinear hyperbolic equations.
(2733) Karen Yagdjian, University of Texas-Pan American (1077-35-2443)

2:30PM Break.

2:45PM Implementation of a Direct D-bar Reconstruction Algorithm for Recovering a Complex Admittivity Distribution from Electrical Impedance Tomography Data. Preliminary report.
(2734) Sarah Jane Hamilton, Colorado State University (1077-35-220)
3:00PM (2735) **Multipeakons in the Degasperis-Procesi Equation II.** Lingjun Zhou, Tongji University (1077-35-1303)

3:15PM (2736) **Frechet Sensitivity Analysis for the Convection-Diffusion Equation.** Vitor Leite Nunes, Virginia Polytechnic Institute & State University (1077-35-287)

3:30PM (2737) **Well-Posedness of Liquid Crystal Flow in $L^p_{loc}$. Preliminary report.** Jay Lawrence Hineman, University of Kentucky (1077-35-2819)

3:45PM (2738) **The Nonlinear Schrödinger equation via fixed point principles.** Mihaela Manole*, Timpson ISD, Texas, and Radu Precup, Babes Bolyai University (1077-35-41)

4:00PM (2739) **Standing-waves solutions to a system of non-linear Klein-Gordon equations with a sub-critical growth non-linearity. Preliminary report.** Daniele Garrisi, POSTECH (1077-35-713)

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**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
Bonne Gold, Monmouth University

1:20PM (2740) **Making sure the students understand a concept by watching them working with it.** Rodica Cazacu, Georgia College (1077-D1-1615)

1:40PM (2741) **Using Online Pretests and Try It Quizzes for Early Assessment and Remediation. Preliminary report.** Brenda Burns-Williams* and Megan Sawyer, North Carolina State University, Raleigh (1077-D1-2735)

2:00PM (2742) **Voting your way to good discussions. Preliminary report.** Christopher K Storm, Adelphi University (1077-D1-2177)

2:20PM (2743) **Formative Assessments in Upper Division Mathematics.** Brian P Kelly, Bryant University (1077-D1-2915)

2:40PM (2744) **Formative assessment and learning trajectories in first semester calculus. Preliminary report.** Rebecca Anne Dibbs, University of Northern Colorado (1077-D1-1184)

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**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 (2747) **Sigma invariants of some self-similar groups.** Susan Hermiller, University of Nebraska, and Zoran Sunic*, Texas A&M University (1077-20-2773)

2:00PM (2748) **Sigma invariants for Thompson and generalised Thompson groups. Preliminary report.** 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 (2749) **The BNS-invariant of pure braid groups. Preliminary report.** John Meier, Lafayette College (1077-20-1838)

3:00PM (2750) **The $\Omega$-invariant of a semi-direct product of groups. Preliminary report.** Nic Koban*, University of Maine Farmington, and Peter Wong, Bates College (1077-20-1666)

3:30PM (2751) **Sigma theory and twisted conjugacy classes.** Daciberg Lima Goncalves*, IME-University of São Paulo, and Dessislava H. Kouchloukova, University of Campinas (1077-20-729)

4:00PM (2752) **$\Omega^n$ invariants and twisted conjugacy classes.** Nic Koban, University of Maine, Farmington, and Peter Wong*, Bates College (1077-20-2323)

4:30PM **Discussion**
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

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)
Paul E Seeberger, 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)
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

Geometric puzzles: Algorithms and complexity.
Erik D. Demaine, Massachusetts Institute of Technology (1077-51-15)
MAA Session on Writing the History of the MAA, II

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 (2770) Digging up the History of a Capital Section. Preliminary report.
Betty Mayfield*, Hood College, and Jon Scott, Montgomery College (1077-Q1-771)

3:20PM (2771) The Kentucky Section. Preliminary report.
Daniel J. Curtin, Northern Kentucky University (1077-Q1-661)

Lawrence A. D’Antonio, Ramapo College of New Jersey (1077-Q1-742)

4:00PM (2773) Women Welcome in the Metro New York Section! Preliminary report.
Agnes M. Kalemaris, Farmingdale State College (1077-Q1-2249)

4:20PM (2774) Writing a History of an MAA Section.
James R Choike, Oklahoma State University (1077-Q1-1275)

4:40PM (2775) Know Your Wisconsin Mathematician: The Oral History of an MAA Section.
Benjamin V.C. Collins*, University of Wisconsin-Platteville, and Jeganathan Sriskandarajah, Madison College (1077-Q1-374)

ASL Invited Address

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

4:15 PM – 6:15 PM Room 207, Hynes

4:15PM (2777) Superstable generic graphs with rich geometries.
Justin Brody, Franklin and Marshall College

4:40PM (2778) Classical consequences of continuous choice principles from intuitionistic analysis.
François G. Dorais, Appalachian State University

5:05PM (2779) Computing boundary extensions of conformal maps.
Timothy H. McNicholl, Lamar University

5:30PM (2780) The decision problem of $T$-
Katalin Bimbo*, University of Alberta, and J.Michael Dunn, Indiana University

Dan E. Willard, University at Albany

AMS Banquet Reception

6:30 PM – 7:30 PM Salon F, 4th Floor, Marriott

AMS Banquet

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