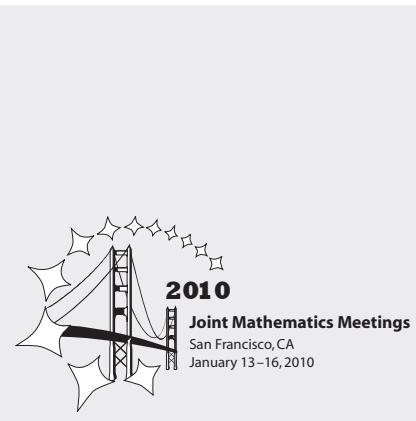


# Welcome to San Francisco



Dear Colleagues,

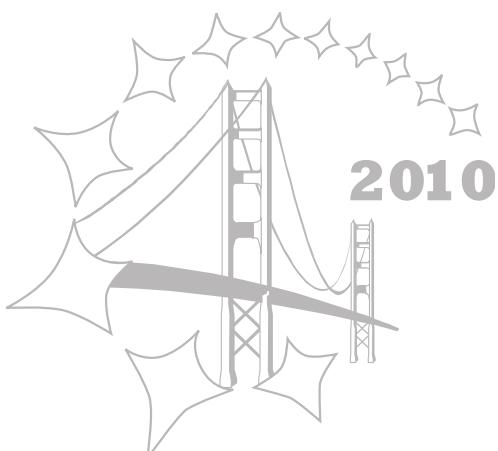
We are delighted to welcome you to the Joint Mathematics Meetings on behalf of the American Mathematical Society and the Mathematical Association of America. We are particularly pleased to have many students and first-time participants at the meeting.

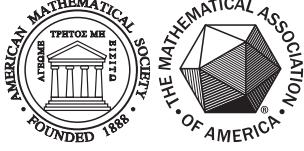
A broad and diverse spectrum of activities and events has been arranged by the meeting organizers and the many people and committees who assisted them. We hope that you will enjoy the outstanding program they have created, and that you will take advantage of the opportunity to renew old acquaintances and make new friends during the San Francisco meetings. We welcome suggestions you may have to make next year's meetings in New Orleans even better.

Sincerely

David M. Bressoud  
President  
Mathematical Association of America

George E. Andrews  
President  
American Mathematical Society





The combined staffs of the American Mathematical Society and Mathematical Association of America welcome you to the Joint Mathematics Meetings in San Francisco. The following staff are looking forward to assisting you in enjoying a successful meeting.

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**Joint Mathematics Meetings**  
San Francisco, CA  
January 13–16, 2010

## Moscone Center West and San Francisco Marriott Marquis

**January 13–16, 2010**

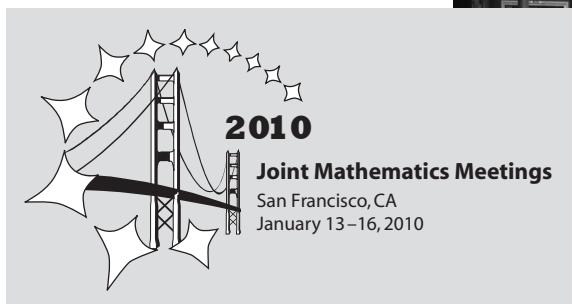
*Wednesday–Saturday*

Joint Mathematics Meetings,  
including the 116th Annual  
Meeting of the American  
Mathematical Society (AMS),  
93rd Annual Meeting of the  
Mathematical Association of  
America (MAA), annual meetings  
of the Association of Women  
in Mathematics (AWM) and  
the National Association of  
Mathematicians (NAM), the  
winter meeting of the Association  
of Symbolic Logic (ASL), with  
sessions contributed by the  
Society for Industrial and Applied  
Mathematics (SIAM).

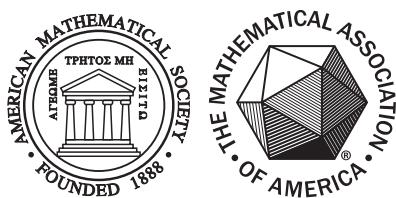
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# AMS-MAA Sessions



## Joint Invited Addresses

**Joseph Harris**, Harvard University, *The interpolation problem*, 11:10 a.m. on Wednesday. (AMS-MAA)

**Brian White**, Stanford University, *Evolving curves and surfaces*, 11:10 a.m. on Friday. (AMS-MAA)

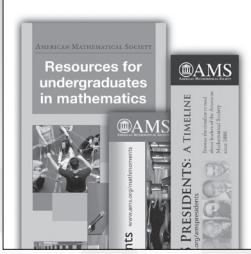
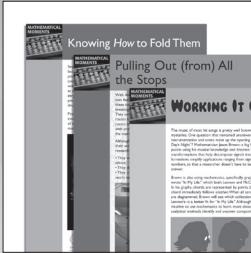
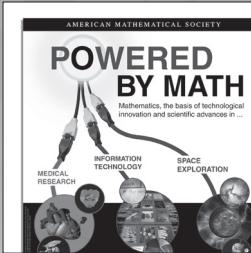
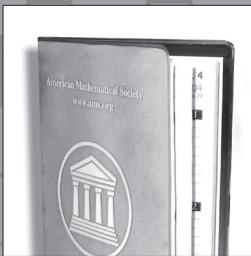
**Steven H. Strogatz**, Cornell University, *The calculus of friendship*, 3:00 p.m. on Saturday. (AMS-MAA-SIAM Gerald and Judith Porter Public Lecture). All are invited to a light reception at the conclusion of the lecture where you may meet and chat with the speaker.

## Joint Prize Session

**Prize Session and Reception:** In order to showcase the achievements of the recipients of various prizes, the AMS and MAA are cosponsoring this event at 4:25 p.m. on Thursday. A cash bar reception will immediately follow. All participants are invited to attend. The AMS, MAA, and SIAM will award the Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student. The AMS will announce the winners of the Distinguished Public Service Award, Levi L. Conant Prize, E. H. Moore Research Article Prize, David P. Robbins Prize, Leroy P. Steele Prizes, Oswald Veblen Prize in Geometry, and the Norbert Wiener Prize in Applied Mathematics. The MAA will award the Chauvenet Prize, Euler Book Prize, Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics, Deborah and Franklin Tepper Haimo Awards for Distinguished College or University Teaching of Mathematics, and Certificates of Meritorious Service. The AWM will present the Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman and the Louise Hay Award for Contributions to Mathematics Education.

This session will also be the venue for the announcement of the Joint Policy Board for Mathematics Communication Award.





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# 116th Meeting of the AMS

## AMS Invited Addresses

**James G. Glimm**, Stony Brook University, *Reflections and prospectives* (AMS Retiring Presidential Address), 3:20 p.m. on Thursday. Lecture notes will be available at the lecture.

**Olga Holtz**, University of California-Berkeley, Technische Universität Berlin, and Institute for Advanced Study, *Zonotopal algebra, analysis, and combinatorics*, 10:05 a.m. on Friday.

**Richard W. Kenyon**, Brown University, *Laplacians on vector bundles on graphs*, 2:15 p.m. on Thursday.

**Igor Y. Rodnianski**, Princeton University, *Evolution problem in General Relativity*, 9:00 a.m. on Saturday.

**Peter W. Shor**, Massachusetts Institute of Technology, *Quantum channels and their capacities* (AMS Josiah Willard Gibbs Lecture), 8:30 p.m. on Wednesday

**Richard P. Stanley**, Massachusetts Institute of Technology, *Permutations: 1) Increasing and decreasing subsequences; 2) Alternating permutations; 3) Reduced decompositions* (AMS Colloquium Lectures), Wednesday-Friday at 1:00 p.m. Lecture notes are available through the link at [www.ams.org/amsmtgs/colloq-10.pdf](http://www.ams.org/amsmtgs/colloq-10.pdf).

**Amie Wilkinson**, Northwestern University, *Chaos and symmetry in partially hyperbolic systems*, 10:05 a.m. on Wednesday.

## AMS Special Sessions

Some sessions are cosponsored with other organizations. These are noted within the parentheses at the end of each listing, where applicable.

*Algebraic Aspects of Cryptology*, **Jintai Ding**, University of Cincinnati, and **Chris Christensen**, Northern Kentucky; Wednesday morning and afternoon.

*Algebraic Methods in Signal Processing*, **Shamgar Gurevich**, University of California Berkeley, **Ronny Hadani**, University of Chicago, **Olga Holtz**, University of California Berkeley and Technical University Berlin, **Oded Schwartz**, Technical University Berlin, and **Nir Sochen**, Tel Aviv University; Thursday morning and afternoon.

*Analysis and Control Under Uncertainty*, **Xiaoming Wang**, Florida State University, **Yanzhao Cao**, Auburn University, and **Catalin Trenchea**, University of Pittsburgh Thursday morning and afternoon.

*Applications of Algebraic Geometry*, **Frank Sottile**, Texas A&M University, and **Luis Garcia-Puente**, Sam Houston State University (AMS-SIAM); Thursday morning and afternoon.

*Applications of Graph Theory*, **Richard Low**, San Jose State University, and **Ralucca M. Gera**, Naval Postgraduate School; Wednesday morning and afternoon.

*Applications of Time Scales to Biology, Economics, and Engineering*, **Martin Bohner**, Missouri University of Science and Technology, **Billur Kaymakcalan**, Southern University-Statesboro, and **Allan Peterson**, University of Nebraska-Lincoln; Thursday morning and afternoon.

*Arithmetic Geometry*, **Bo-Hae Im**, Chung-Ang University, **Jennifer Johnson-Leung**, University of Idaho, and **Jennifer Paulhus**, Kansas State University; Thursday morning and afternoon.

*Arithmetic and Nonarchimedean Dynamics*, **Joseph Silverman**, Brown University, **Michelle Manes**, University of Hawaii, and **Raphael Jones**, College of the Holy Cross; Wednesday morning and afternoon.

*Arithmetic of Function Fields*, **Allison Pacelli**, Williams College, and **Michael Rosen**, Brown University; Thursday morning and afternoon.

*Biomathematics: Modeling in Biology, Ecology, and Epidemiology*, **Linda Allen**, Texas Tech University, **Olcay Akman**, Illinois State University, **Timothy D. Comar**, Benedictine University, and **Sophia Jang** and **Lih-Ing Roeger**, Texas Tech University; Friday and Saturday mornings and Saturday afternoon.

*Categorical and Algebraic Methods in Representation Theory*, **Jon Brundan**, University of Oregon, **Julia Pevtsova**, University of Washington, and **Eric Friedlander**, University of Southern California; Saturday morning and afternoon.

*Commutative Algebra*, **Susan Cooper**, University of Nebraska-Lincoln, and **Graham Leuschke**, Syracuse University; Thursday morning and Friday afternoon.

*Degenerate and Singular Elliptic Partial Differential Equations*, **Marian Bocea** and **Cristina Popovici**, North Dakota State University; Wednesday morning and Thursday afternoon.

*Difference Equations and Applications*, **Michael Radin**, Rochester Institute of Technology; Wednesday morning and afternoon.

*Differential Galois Theory and Group Representations: A Tribute to Andy Magid*, **James Carrell**, University of British Columbia, **Lourdes Juan**,



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Texas Tech University, **Alex Lubotzky**, Hebrew University, **Brian Parshall**, University of Virginia, and **Marius van der Put**, University of Groningen; Friday and Saturday afternoons.

*Enumerative Combinatorics*, **Brian Miceli**, Trinity University, and **Jeff Remmel**, University of California San Diego; Friday morning and afternoon.

*Geometric Aspects of Link and 3-manifold Invariants*, **Oliver Dasbach**, Louisiana State University, and **Effie Kalfagianni**, Michigan State University; Wednesday afternoon and Thursday morning.

*Graph Algebras in Analysis and Algebra*, **Gene Abrams**, University of Colorado at Colorado Springs, and **Mark Tomforde**, University of Houston; Thursday morning and afternoon.

*Harmonic Analysis*, **Kabe Moen**, Washington University; **Richard Oberlin**, University of California Los Angeles; and **Betsy Stovall**, University of California Los Angeles (a Mathematics Research Communities session); Wednesday morning and afternoon.

*Harmonic Analysis and Representations of Reductive  $p$ -adic Groups*, **Robert Doran**, Texas Christian University, **Paul J. Sally Jr.**, University of Chicago, and **Loren Spice**, Texas Christian University; Saturday morning and afternoon.

*History of Mathematics*, **Craig Fraser**, University of Toronto, **Deborah Kent**, Hillsdale College, and **Sloan Despeaux**, Western Carolina University (AMS-MAA); Friday and Saturday afternoons and Saturday morning.

*Integrability of Dynamical Systems and Solitons Equations*, **Zhijun Qiao**, University of Texas-Pan American, **Taixi Xu**, Southern Polytechnic State University, and **Wenxiu Ma**, University of South Florida; Saturday morning and afternoon.

*Interactions of Inverse Problems, Signal Processing and Imaging*, **M. Zuhair Nashed**, University of Central Florida; Thursday and Friday mornings.

*Inverse Problems: Analysis and Computations*, **Gaik Ambartsoumian**, University of Texas at Arlington, **Raluca Felea**, Rochester Institute of Technology, **Hongyu Liu**, University of Washington, **Kui Ren**, University of Texas at Austin, and **Michael VanValkenburgh**, University of California Berkeley (a Mathematics Research Communities session); Wednesday morning and afternoon.

*L-Functions and Analytic Number Theory*, **Alina Bucur**, Institute for Advanced Study and University of California, San Diego; **Chantal David**, Concordia University; and **Matilde Lalín**, University of Alberta; Friday morning and afternoon.

*Markov Chains and Their Statistical Applications*, **James Flegal**, University of California Riverside, **Radu Herbei**, Ohio State University, and **Jessica Zuniga**, Stanford University (a Mathematics

Research Communities session); Wednesday morning and afternoon.

*Mathematical Challenges of Relativity*, **Paul T. Allen**, Lewis & Clark College, **Michael Eichmair**, M.I.T. and Monash University, **Gustav Holzegel**, Princeton University, **Jared Speck**, University of Cambridge, and **Willie W. Wong**, University of Cambridge (a Mathematics Research Communities session); Wednesday morning and afternoon.

*Mathematics and Physical Experiment*, **Roger Thelwell**, **Anthony Tongen**, and **Paul Warne**, James Madison University; Friday and Saturday mornings.

*Mathematics of Computation*, **Susanne Brenner**, Louisiana State University, and **Chi-Wang Shu**, Brown University (AMS-SIAM); Wednesday morning and afternoon.

*Nonlinear Hyperbolic Equations and Control Systems in Physics and Engineering*, **Petronela Radu** and **Daniel Toundykov**, University of Nebraska-Lincoln; Thursday afternoon and Friday morning.

*Optimal Frames and Operator Algebras*, **David Larson**, Texas A&M University, **Deguang Han**, University of Central Florida, and **Shidong Li**, San Francisco State University; Saturday morning and afternoon.

*Parabolic Geometries, Integrable Systems, and Twistor Theory*, **Dana Mihai**, Carnegie Mellon University, and **Jonathan Holland** and **George Sparling**, University of Pittsburgh; Saturday morning and afternoon.

*Permutations*, **Richard P. Stanley**, M.I.T., **Ira M. Gessel**, Brandeis University, and **Persi W. Diaconis**, Stanford University; Saturday morning and afternoon.

*Recent Advances in Evolution Equations and Applications*, **Guoping Zhang** and **Gaston N'Guerekata**, Morgan State University, **Yi Li**, University of Iowa, and **Wen-Xiu Ma**, University of South Florida; Friday afternoon.

*Representation Theory and Nonassociative Algebras*, **Andrew Douglas**, City University of New York; Thursday afternoon and Friday morning.

*Research in Mathematics by Undergraduates*, **Darren Narayan** and **Bernard Brooks**, Rochester Institute of Technology, **Jacqueline Jensen**, Sam Houston State University, **Carl V. Lutzer**, Rochester Institute of Technology, **Vadim Ponomarenko**, San Diego State University, and **Tamas Wiandt**, Rochester Institute of Technology (AMS-MAA-SIAM); Friday and Saturday, mornings and afternoons.

*Spectral Problems on Compact Riemannian Manifolds*, **Carolyn Gordon**, Dartmouth College, **Ruth Gornet**, University of Texas at Arlington, and **Craig Sutton**, Dartmouth College (AMS-AWM); Friday morning and afternoon.

*Surreal Numbers*, **Lou van den Dries**, University of Illinois, and **Philip Ehrlich**, Ohio University (AMS-ASL); Wednesday morning and afternoon.

*The Mathematics of Information and Knowledge*, **Naoki Saito**, University of California Davis, **Ronald R. Coifman**, Yale University, **James G. Glimm**, SUNY at Stony Brook, **Peter W. Jones**, Yale University, **Mauro Maggiioni**, Duke University, and **Jared Tanner**, University of Edinburgh; Thursday morning and Friday afternoon.

*Use of Technology in Modern Complex Analysis Research*, **Beth Schaubroeck**, U.S. Air Force Academy, **Michael Dorff**, Brigham Young University, and **James Rolf**, U.S. Air Force Academy; Thursday afternoon and Friday morning.

*Voting Theory*, **Michael Jones**, Mathematical Reviews, **Brian Hopkins**, Saint Peter's College, and **Tommy Ratliff**, Wheaton College; Thursday morning and afternoon.

*Zonotopal Algebra and Its Applications*, **Olga Holtz**, University of California-Berkeley, Technical University Berlin, and Institute for Advanced Study; and **Amos Ron**, University of Wisconsin.

## AMS Contributed Papers

There will be sessions for contributed papers of ten minutes' duration these topics on these days: *Algebraic Geometry*, Friday morning; *Algebras I and II*, Friday afternoon and Saturday afternoon; *Approximations*, Friday morning; *Biomathematics I, II, III*, Thursday morning and afternoon, and Friday morning; *Category Theory*, Wednesday morning; *Complex Analysis*, Wednesday morning; *Computational Math I, II, III, IV*, Thursday afternoon, Friday afternoon, Saturday morning and afternoon; *Difference Equations and Time Scales*, Friday morning; *Differential and Difference Equations I, II, III, IV*, Thursday and Friday, mornings and afternoons; *Discrete Mathematics I, II, III, IV, V, VI*, Wednesday morning and afternoon, Thursday afternoon, Friday morning and afternoon, Saturday afternoon; *Fields and Commutative Algebra*, Thursday afternoon; *Functional Analysis and Operator Theory I, II*, Friday morning and afternoon; *Geometry and Topology I, II, III, IV*, Wednesday morning and afternoon, Thursday morning, and Saturday afternoon; *Group Theory I, II, III*, Wednesday morning and afternoon, Saturday morning; *History of Mathematics*, Friday morning; *Mathematics Education*, Friday afternoon; *Mathematics in the Social Sciences*, Wednesday morning; *Matrices and Tensors*, Wednesday morning; *Number Theory I, II, III, IV*, Thursday morning and afternoon, Saturday morning and afternoon; *Optimization and Control*, Saturday afternoon; *Probability and Statistics I, II, III, IV*, Wednesday morning and afternoon, Thursday morning and Saturday morning; *Real and Special Functions*, Saturday

morning; *Research by Undergraduates*, Saturday morning and afternoon.

## Other AMS Sessions

**Elementary School Teachers as Mathematicians: As the Twig is Bent the Tree Grows**, Wednesday, 4:30 p.m.–6:00 p.m. This presentation by **Kenneth I. Gross**, University of Vermont, will focus on the critical importance of raising the mathematics knowledge of elementary teachers, the Vermont model for doing so, and the role to be played by college and university mathematics faculty. If we are to raise student achievement at all educational levels and for all students, we must provide elementary teachers with more broad and understanding of mathematics and the capability to translate that knowledge into the elementary school classroom. Sponsored by the AMS and MAA.

**Hard Problems, Approximate Solutions: Finding Balance between Math and Family Demands**, Thursday, 1:00 p.m.–2:30 p.m., organized by **Kathleen M. O'Hara**, Mathematical Sciences Research Institute. Virginia Wolf said it all in "A Room of One's Own." How do we find time for our own mathematical work amidst intergenerational family demands? The challenges of balancing family life (such as raising children, caring for elderly parents, providing child care for grandchildren, or supporting a partner) with a professional life are myriad.

This panel, the first in a series of panels on this issue, will focus on two approaches to a solution: successful institutional models that allow time for family responsibilities and personal frameworks that allow time for career goals. Panelists presenting the larger issues of family and work within academia include **Mary Ann Mason** and **Marc Goulden**, University of California, Berkeley, co-authors of the paper *Do Babies Matter? The Effect of Family Formation on the Lifelong Careers of Academic Men and Women*; and **Carol Hollenshead**, former director of the University of Michigan's Center for the Education of Women and co-author of *Developing and Implementing Work Family Policies for Faculty*. **Maura B. Mast**, University of Massachusetts, Boston, and **Judy L. Walker**, University of Nebraska, will provide perspectives on institutional and personal approaches to surviving the family-work crunch. Sponsored by the AMS-ASA-AWM-IMS-MAA-NCTM-SIAM Joint Committee on Women in the Mathematical Sciences.

**What I Wish I Had Known When Applying for a Job**, Thursday, 2:45 p.m.–4:15 p.m., moderated by **Christopher K. McCord**, Northern Illinois University. This panel will give a first-person look at the process of applying for positions, both inside and outside academia. Through their experiences, panelists will help young mathematicians understand

## 116th Meeting of the AMS

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how to approach the job search process: what to expect, how to prepare, what to do, and what not to do. This session will focus on the employment opportunities for doctoral students and recent Ph.D. graduates, and will give you lots of chances for Q & A with panelists. The panelists will include both people who have recently been on the job market, and people who have recently been on hiring committees, and include **Elizabeth T. Beazley**, University of Michigan and Williams College; **Julie Bergner**, University of California, Riverside; **Karl Kempf**, Intel and Arizona State University; **Bryna Kra**, Northwestern University; and **Ken Ono**, University of Wisconsin-Madison. Sponsored by the Committee on the Profession.

**Who Wants to Be a Mathematician—National Contest**, Thursday, 9:30 a.m.–11:00 a.m., organized by **Michael A. Breen**, AMS, and **William T. Butterworth**, DePaul University. See ten of the nation's best high school students compete for a US\$5000 first prize for themselves and US\$5000 for their school's math department. Contestants include Ofir Nachum (MA), Ben Zauzmer (PA), Daniel Li (VA), Rebecca Easterwood (AL), Brian Freidin (IL), Rohit Agrawal (MN), Kathy Lin (NM), Charles Xu (CO), and Kevin Yin (CA). Semifinals are at 9:30 a.m. and finals at 10:30 a.m. You are invited to come and take part in this educational and fun presentation.

**Hilbert's Tenth Problem**, Thursday, 10:00 a.m.–noon, organized by **Jeremy Avigad**, Carnegie Mellon University; **Penelope Maddy**, University of California Irvine; and **Charles Steinhorn**, Vassar College. The tenth problem in Hilbert's famous list sought an algorithm that would test a given polynomial equation with integer coefficients in any number of variables to determine whether it had integer solutions. In 1970 Yuri Matiyasevich, building on earlier work over a twenty-year period by Martin Davis, Hilary Putnam, and Julia Robinson, proved that no such algorithms exists. Subsequent efforts seek to determine whether there is such an algorithm for solutions in various rings, especially in the ring of integers of an algebraic number field, and in the rational numbers. The members of the panel, **Martin Davis**, Courant Institute of Mathematical Sciences (moderator); **Bjorn Poonen**, M. I. T.; **Karl Rubin**, University of California, Irvine; and **Alexandra Shlapentokh**, East Carolina University, all of whom have contributed either to the solution of Hilbert's original problem or to the later developments, will address various aspects of this endeavor. Cosponsored by the AMS, ASL, and MAA.

**Grad School Fair**, Friday, 8:30 a.m.–10:30 a.m. Here is the opportunity for undergrads to meet representatives from mathematical sciences graduate programs from universities all over the country. January is a great time for juniors to learn more,

and college seniors may still be able to refine their search. This is your chance for one-stop shopping in the graduate school market. At last year's meeting about 300 students met with representatives from 45 graduate programs. If your school has a graduate program and you are interested in participating, a table will be provided for your posters and printed materials for US\$50 (registration for this event must be made by a person already registered for the JMM), and you are welcome to personally speak to interested students. Complimentary coffee will be served. Cosponsored by the AMS and MAA.

**Conversation on Nonacademic Employment**, Friday, 9:30 a.m. to 11:00 a.m., organized and moderated by **James G. Glimm**, SUNY at Stony Brook. This session will concentrate on how to find nonacademic positions, types of jobs, the interview process, work environments, and advancement opportunities. The discussion will be led by a panel of mathematical scientists working in government, business, and industry.

**Current Events Bulletin**, Friday, 1:00 p.m.–5:00 p.m., organized by **David Eisenbud**, University of California Berkeley. Speakers in the session include **Laura G. DeMarco**, University of Illinois at Chicago; **Ben J. Green**, University of Cambridge; **Peter Teichner**, University of California Berkeley; and **David G. Wagner**, University of Waterloo. This session follows the model of the Bourbaki Seminars in that mathematicians with strong expository skills speak on work not their own. Written versions of the talks will be distributed at the meeting and also be available on line at [www.ams.org/ams/current-events-bulletin.html](http://www.ams.org/ams/current-events-bulletin.html) after the conclusion of the meeting.

**Evaluating the NSF's VIGRE Program**, Friday, 2:30 p.m.–4:00 p.m. **Ronald J. Stern**, University of California-Irvine, will moderate this panel discussion. Panelists **Efraim P. Armendariz**, University Texas-Austin; **Lawrence Craig Evans**, University of California-Berkeley; **Peter D. March**, National Science Foundation; and **Karen Vogtmann**, Cornell University, will discuss the Board of Mathematics Sciences and Their Applications new report. Sponsored by the Committee on Science Policy.

**Congressional Fellowship Session**, Friday, 4:30 p.m.–6:30 p.m., organized by **Samuel M. Rankin III**, AMS. This session will describe the AMS Congressional Fellowship, administered by the American Association for the Advancement of Science (AAAS), and the fellowship's unique public policy learning experience. This fellowship demonstrates the value of science-government interaction by allowing the fellows to bring a technical background and external perspective to the decision-making process in Congress. Previous and current AMS-sponsored Congressional Fellows will give their perspectives

on the fellowship to interested meeting participants in an effort to encourage applications for future fellowships. The application deadline for the 2010-11 AMS Congressional Fellowship is February 15, 2010.

**The Common Core State Standards Will They Become our National K-12 Curriculum?**, Saturday, 8:30 a.m.-10:00 a.m. This panel discussion will be moderated by **Lawrence Gray**, University of Minnesota. The Common Core State Standards is a major attempt to create a unified set of curriculum standards in math and language arts for grades K-12. It is sponsored by the National Governor's Association, together with several other national organizations, and it has a very short time line. Find out what it's all about through several brief presentations and Q & A. Sponsored by the Committee on Education

## Other AMS Events

**Council:** Tuesday, 1:30 p.m.

**Business Meeting:** Saturday, 11:45 a.m. The secretary notes the following resolution of the Council: Each person who attends a business meeting of the Society shall be willing and able to identify himself as a member of the Society. In further explanation, it is noted that each person who is to vote at a meeting is thereby identifying himself as and claiming to be a member of the American Mathematical Society.

## AMS Short Course

This two-day course on *Markov Chains and Mixing Times* is organized by **David Levin**, University of Oregon; **Yuval Peres**, University of California Berkeley and Microsoft; and **Elizabeth Wilmer**, Oberlin College, and takes place on Monday and Tuesday, January 11 and 12. See the complete article and fee schedule at [www.ams.org/amsmtgs/2124\\_amssc.html](http://www.ams.org/amsmtgs/2124_amssc.html).

Convergence of finite Markov chains to their stationary distributions is an extremely active research area. Many of the arguments are both beautiful and accessible, and the field interacts closely with both theoretical computer science and statistical physics. The main goal of both our book *Markov Chains and Mixing Times* and this Short Course is to encourage wider dissemination of this material to a broad mathematical audience. Much of the material which we will present is related to very recent research in the area.

Markov chains are a general class of stochastic processes which under mild regularity conditions converge in distribution to a unique stationary probability distribution. Traditionally, undergraduate treatments of Markov chains have focused on analyzing a fixed chain as time goes to infinity. In

the past two decades a different asymptotic analysis has emerged. For a Markov chain with a large state space, we care about the finite number of steps needed to get the distribution reasonably close to the limit (stationary) distribution. This number is known as the mixing time of the chain, and there are now many methods for determining its behavior as a function of the geometry and size of the state space.

In 1986 Aldous and Diaconis wrote a wonderful Monthly article on mixing times. Since then, the field and its fruitful interactions with computer science and statistical physics have grown tremendously. In the spring of 2005 a research program on Probability, Algorithms, and Statistical Physics was held at the Mathematical Sciences Research Institute in Berkeley, California. This multidisciplinary program united the interests of mathematicians, computer scientists, and physicists in discrete probabilistic models, and one of its major themes was the rigorous study of mixing times for finite Markov chains. Since much of the theory of Markov chain convergence was developed by physicists and computer scientists, the course will allow participants to see how mathematics is enriched by interaction with other disciplines. Several of the models which we will examine in the course will be "particle systems" arising in statistical physics. Interestingly, many of these models exhibit phase transitions: behavior of the model may change abruptly as a parameter describing local interactions passes through a critical value. For our particle systems, the mixing time may vary "fast" (polynomial in the instance size  $n$ ) to "slow" (exponential in  $n$ ) as interaction parameters pass through a critical value.

Talks will be given by the organizers and also by **David Aldous** and **Alistair Sinclair**, University of California, Berkeley. In lieu of traditional lecture notes the book, *Markov Chains and Mixing Times*, co-authored by the organizers, will be provided free of charge to the first 80 people who register for this course. A voucher will be provided to all other registrants that will allow them to purchase the book at the deeply discounted price of US\$32.

## AMS Tutorial on Modeling

This tutorial will be an introduction to both numerical and statistical modeling for those who are not currently studying computational science. It is especially designed for individuals who are considering nonacademic employment. The tutorial will be divided into two sessions, each lasting one day. The cost for both sessions is US\$25.

**Introduction to Numerical Modeling**, Monday, 9:00 a.m.-noon and 1:30 p.m.-4:30 p.m., presented by **Chi-Wang Shu**, Brown University.

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In today's job market, Ph.D. students in mathematics might improve their chances of getting employment if they consider jobs outside the traditional academic job market. Students who have expertise in numerical modeling are marketable to many different types of non-academic employers, including government research labs, research labs of large companies (such as the oil companies), and various computer software companies (such as those who write software for medical science and health industry or for financial markets). Even for students whose major expertise is not in numerical modeling, some knowledge of numerical modeling should enhance the chance to obtain employment from many non-academic employers.

This one-day tutorial is intended for graduate students who are not working in areas related to computational science (numerical analysis, scientific computing, computational engineering, etc.), but would be interested in an introduction to some fundamental ideas for entry level numerical modeling.

The tutorial will start with a general description of numerical modeling, and will explain the difference between a student in a mathematics department majoring in computational science and a student in computer science. While programming (in C or another language) is a necessary skill for any student in numerical modeling, it is the mathematical insight which allows mathematicians to design and improve algorithms that are stable, accurate, and efficient for various applications.

The tutorial will then move to the description of a few selected topics in numerical modeling, including the solutions of large linear systems, the approximations of ordinary differential equations, and finite difference, finite element, and spectral methods for approximating partial differential equations. While it is impossible to give an in-depth coverage of so many topics in one day, we will emphasize the fundamental concepts such as stability, accuracy and efficiency for these algorithms. The tutorial will end with a list of references which will allow interested audience to follow up to gain more in-depth knowledge of the exciting area of numerical modeling.

The lecturer, Professor Chi-Wang Shu, has trained over twenty Ph.D.s at Brown University who are now employed both by academic and by non-academic employers. His research expertise is in scientific computing. In 2007 he was awarded the SIAM/ACM Prize in Computational Science and Engineering jointly by the Society for Industrial and Applied Mathematics, the major society for applied and computational mathematicians, and by the Association for Computing Machinery, the major association for computer scientists. Professor Shu is Managing Editor of *Mathematics of Computation* and Editor-in-Chief of *Journal of Scientific Computing*.

**Introduction to Statistical Modeling**, Tuesday, 9:00 a.m.-noon and 1:30 p.m.-4:30 p.m., presented by **Wei Zhu**, State University of New York at Stony Brook.

Statistics is a branch of the mathematical sciences that pertains to the collection and analysis of data. The goal of statistical inference is to make a probabilistic statement about the underlying population based on the given sample. A classical statistical model is usually one or a set of stochastic equations (linear or nonlinear) linking the relevant variables observed. For example, one may wish to establish a simple linear regression model predicting the height of a son based on the height of his father. To estimate the regression line, one can simply employ the ordinary least squares (OLS) method developed by Gauss and Legendre. However, when randomness exists in both measurements, the OLS method will no longer be suitable. For instance, in gauging the relationship between the concentrations of organic aerosols and anthropogenic carbon monoxide, we found that both quantities, measured by the mass spectrometer and the UV fluorescence analyzer respectively, contain measurement errors and possibly other volatilities due to air dynamics, and thus the OLS method is obsolete in this situation. What are the alternative modeling methods?

In this one-day workshop intended for those who wish to broaden their horizons (and job market if pertinent) by learning more statistics, we will present a summary of classical as well as modern statistical modeling methods. Beginning with the simple linear regression introduced above, we will move on to the generalized linear models, categorical data analysis, time series models, survival analysis, and structural equation modeling (also called path analysis). We will discuss pertinent job markets and the knowledge/skills necessary for those markets. We will conclude the workshop by introducing the bootstrap resampling method and its role in modern statistical modeling and inference. A list of reference books corresponding to these subjects will be provided for the interested audience.

The lecturer, Professor Wei Zhu, has a B.S. in mathematics and a Ph.D. in Biostatistics. For the past decade, she has applied statistics to a wide spectrum of problems including brain imaging analysis, climate modeling, clinical trials, genetics and proteomics. She is an active educator whose former doctoral students are currently employed in academia, the pharmaceutical, Internet, and financial industries. She is the director of the Data Management and Statistical Analysis Core of the Alzheimer's Disease Research Center at New York University. She is also the director of the Bioinformatics Laboratory at the SBU Center of Excellence in Wireless and Information Technology. She collaborates closely with

scientists from the Brookhaven National Laboratory, the Cold Spring Harbor Laboratory, and the National Institutes of Health.

### **Department Chairs Workshop**

This annual one-day workshop for chairs and leaders of departments of mathematical sciences will be held a day before the start of the Joint Meetings on Tuesday, 8:00 a.m.-6:30 p.m. The workshop format is intended to stimulate discussion among attending chairs and workshop leaders. Sharing ideas and experiences with peers provides a form of department chair therapy, creating an environment that enables attending chairs to address departmental matters from new perspectives.

Workshop leaders are **Lawrence Gray**, former Chair and Director of Undergraduate Studies, School of Mathematics, University of Minnesota; **John Meakin**, Chair, Department of Mathematics, University of Nebraska-Lincoln; and **Stephen Robinson**, Chair, Department of Mathematics, Wake Forest University.

Past workshop sessions have focused on a range of issues facing departments today, including personnel issues (staff and faculty), long-range planning, hiring, promotion and tenure, budget management, assessments, outreach, stewardship, junior faculty development, communication, and departmental leadership.

There is a separate registration fee to participate. For more information and to register, visit <http://www.ams.org/government/ChairsWorkshop2010.RSVPForm.pdf>. For further information please contact the AMS Washington Office at 202-588-1100 or [amsdc@ams.org](mailto:amsdc@ams.org).

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# 93rd Annual Meeting of the MAA

## MAA Invited Addresses

**Manjul Bhargava**, Princeton University, *The factorial function, integer-valued polynomials, and  $p$ -adic calculus*, 3:20 p.m. on Wednesday.

**Lenore Blum**, Carnegie Mellon University, *The real computation controversy; Is it real?* 2:15 p.m. on Wednesday.

**Dusa McDuff**, Barnard College, Columbia University, *Symplectic embeddings and continued fractions*, 10:05 a.m. on Saturday.

**Glen Van Brummelen**, Quest University, *Reasonable effectiveness: Trigonometry, ancient astronomy, and the birth of applied mathematics*, 9:00 a.m. on Thursday.

**Sue Whitesides**, University of Victoria, *Excursions in geometry and theoretical computer science*, 9:00 a.m. on Friday.

## Presentations by Teaching Award Recipients

Friday, 2:30 p.m.-4:00 p.m., organized by MAA Secretary **Martha J. Siegel**, Towson University, and moderated by MAA President, **David M. Bressoud**, Macalester College. Winners of the Deborah and Franklin Tepper Haimo Awards for Distinguished College or University Teaching, including **Curtis D. Bennett**, Loyola Marymount University; **Michael J. Dorff**, Brigham Young University; and **Allan Rossman**, California Polytechnic State University San Luis Obispo, will give presentations on the secrets of their success.

## MAA Invited Paper Sessions

**Environmental Modeling**, organized by **Ben Fusaro**, Florida State University, and **Karen Bolinger**, Clarion University; Thursday morning.

**Gems of Number Theory**, organized by **Thomas Koshy**, Framingham University; Thursday morning. This session highlights the beauty and elegance of number theory by focusing on fascinating and sophisticated results, developed over two thousand years through boundless enthusiasm, human ingenuity, and creativity.

**Mathematics and Education Reform**, organized by **William H. Barker**, Bowdoin College; **William G. McCallum**, University of Arizona; and **Bonnie S. Saunders**, University of Illinois at Chicago; Thursday afternoon and Friday morning and afternoon. Cosponsored by the MAA, AMS, and MER.

**Online Delivery of Mathematics**, organized by **Bernd S. W. Schroeder**, Louisiana Tech University; Wednesday afternoon.

**The Mathematics of Origami**, organized by **Tamara Veenstra**, University of Redlands, and **Thomas C. Hull**, Western New England College; Friday morning. Mathematical methods in origami (paper folding) have been receiving increased attention, with applications to protein folding, education, and any number of engineering projects ranging from nanotechnology to heart stents to airbags to solar panel arrays. This session will include general talks on the different aspects of origami mathematics and describe recent advances in the field.

**The Scholarship of Teaching and Learning in Mathematics**, organized by **Jacqueline M. Dewar**, Loyola Marymount University; **Thomas F. Banchoff**, Brown University; and **Pam Crawford**, Jacksonville University; Saturday morning. Cosponsored by the MAA and AMS.

## MAA Minicourses

Minicourses are open only to persons who register for the Joint Meetings and pay the Joint Meetings registration fee in addition to the appropriate minicourse fee. The MAA reserves the right to cancel any minicourse that is undersubscribed. Participants in minicourses #1-#4 are required to bring their own laptop computer equipped with appropriate software. Instructions on how to download any data files needed for those courses will be provided by the organizers. All minicourses will be held in the San Francisco Marriott Hotel. The enrollment in each minicourse is limited to 50; the cost for each minicourse is US\$75.

**Minicourse #1: Remodeling data analysis**, organized by **Daniel Kaplan** and **Vittorio Addona**, Macalester College. Part 1: Thursday, 10:30 a.m.-12:30 p.m.; Part 2: Saturday, 1:00 p.m.-3:00 p.m. This minicourse presents an approach taken in the first course in statistics and data analysis at Macalester College to bring meaningful mathematics back into data analysis courses by way of statistical modeling. Doing so can dramatically improve the ability of students to analyze data from complex, real-world, multi-variable systems. Modeling provides a strong mathematically unifying framework for statistics and at the same time ties the course more closely to the scientific method and exigencies of realistic, multi-variable data. As a genuine data analysis course that fully implements the GAISE standards, it is required for mathematics majors and other client disciplines like biology and



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economics. However, it is attractive for liberal arts majors as well. In addition to outlining the statistical modeling approach, the mini-course will provide participants with materials—texts, exercises, in-class activities, software—they can use to adopt the approach at their own institutions.

**Minicourse #2:** *Using GeoGebra to create activities and applets for visualization and exploration*, organized by **Michael K. May**, Saint Louis University. Part 1: Thursday, 1:00 p.m.–3:00 p.m.; Part 2: Saturday, 3:30 p.m.–5:30 p.m. GeoGebra is an easy to use, free, open source, cross platform, program that allows the user to visualize and experiment with both algebraic and geometric representations of mathematical concepts. Constructions can optionally be saved as applets that can be used in any java-enabled browser. Sample applets can be found at <http://www.slu.edu/classes.maymk/Geo-GeoGebra/>. The minicourse assumes only novice computer skills and covers an introduction to GeoGebra up through deploying applets in Web pages. We will work through creating several activities to illustrate features of the program and to get participants to create their own activities. Participants are encouraged to load GeoGebra and SeaMonkey onto their computers before the workshop. Installation instructions are available at <http://www.slu.edu/classes/maymk/GeoGebra/InstallationOfSoftware.html>.

**Minicourse #3:** *Educating about the state of the planet and sustainability while enhancing calculus*, organized by **Thomas J. Pfaff**, Ithaca College. Part 1: Thursday, 8:00 a.m.–10:00 a.m.; Part 2: Saturday, 9:00 a.m.–11:00 a.m. Are you concerned about the state of the planet? Do you wish you could help? Over the past five to ten years data has become widely available. Further, society now faces major challenges in climate change and energy security. This minicourse will bring together data, Excel, and sustainability to provide richer context and relevance for calculus. Basically students use Excel to fit curves to real data and then all kinds of fundamentally important questions about sustainability become calculus questions about those curves. Overall the goal is to provide the necessary background information, ideas, and tools to successfully incorporate sustainability themes (or other areas of interest) into a calculus course, without having to change the typical content covered in calculus. Participants will need Excel loaded onto their laptops and are encouraged to bring a calculator.

**Minicourse #4:** *Using video case studies in teaching a proof-based gateway course to the mathematics major*, organized by **James T. Sandefur**, Georgetown University, **Connie M. Campbell**, Millsaps College, and **Kay B. Somers**, Moravian College. Part 1: Wednesday, 9:00 a.m.–11:00 a.m.; Part 2: Friday, 9:00 a.m.–11:00 a.m. Many colleges and universi-

ties have a gateway course to help mathematics students make the transition to more theoretical courses, with a goal of helping students learn how to understand and construct proofs. The organizers have been videotaping students writing proofs for problems used in gateway courses, and have been using these videos to expand their understanding of students' difficulties and to learn what support helps the students. They have also been using these videos to help students learn to reflect on their own approaches to writing proofs. In this minicourse, we will discuss strategies implied by the videos, as well as help faculty learn how they might use these videos in their own transition course.

**Minicourse #5:** *Active learning approaches for the foundational mathematics for elementary teachers' courses*, organized by **Laurie J. Burton**, **Cheryl Beaver**, and **Klay T. Kruczak**, Western Oregon University. Part 1: Thursday 10:30 a.m.–12:30 p.m.; Part 2: Saturday, 1:00 p.m.–3:00 p.m. This minicourse is for collegiate mathematics faculty who are new to, or seeking to improve their proficiency in, designing and teaching the K–8 foundational mathematics courses. Minicourse participants will be introduced to the unique challenges of presenting mathematics education content courses to prospective teachers (in contrast to courses directed to other mathematics students) and will be exposed to approaches and resources the workshop leaders have used successfully to meet these challenges. The minicourse will be a hands-on interactive environment showcasing effective pedagogical techniques.

**Minicourse #6:** *Developing departmental self-studies*, organized by **Donna L. Beers**, Simmons College, and **Nancy Baxter Hastings**, Dickinson College. Part 1: Wednesday, 2:15 p.m.–4:15 p.m.; Part 2: Friday, 2:15 p.m.–4:15 p.m. Self-study is a critical component of departmental program review. It is retrospective, engaging department members and other interested parties (e.g., other departments and the administration) in examining all aspects of departmental programs. It is also forward-looking anticipating new areas for growth and contribution. Self-study entails discussion of issues confronting a department; as such, it is both a process of reflection and a report. This minicourse enables participants to determine how a self-study, which is an administrative mandate, can be a positive opportunity for departmental renewal.

**Minicourse #7:** *Teaching with clickers in the classroom*, organized by **Derek Bruff**, Vanderbilt University, and **Adam Lucas**, Saint Mary's College of California. Part 1: Wednesday, 9:00 a.m.–11:00 a.m.; Part 2: Friday, 9:00 a.m.–11:00 a.m. Classroom response systems ("clickers") are technologies that enable teachers to rapidly collect and analyze student responses to multiple-choice (and sometimes free-response) questions during class. These systems can be used

to engage and assess students in any size class on a variety of topics, including precalculus, calculus, differential equations, linear algebra, and statistics. This minicourse explores questions and activities that make the most of these systems, as well as solutions to common challenges involved in teaching with clickers, including writing effective clicker questions, structuring class time using clickers, and responding to results of clicker questions.

**Minicourse #8:** *The Fibonacci and Catalan numbers*, organized by **Ralph Grimaldi**, Rose-Hulman Institute of Technology. Part 1: Thursday, 8:00 a.m.-10:00 a.m.; Part 2: Saturday, 9:00 a.m.-11:00 a.m. In many introductory courses in discrete mathematics or combinatorics, one often encounters the sequences of numbers called the Fibonacci numbers and the Catalan numbers. This minicourse is designed to demonstrate how certain properties of these sequences come about and to examine where ideas related to these sequences arise in applications dealing with geometry, trigonometry, set theory, number theory, tilings, permutations, chemistry, optics, electrostatics, probability, data structures, lattice paths, and graph theory.

**Minicourse #9:** *Getting students involved in undergraduate research*, organized by **Aparna W. Higgins**, University of Dayton, and **Joseph A. Gallian**, University of Minnesota Duluth. Part 1: Thursday, 1:00 p.m.-3:00 p.m. Part 2: Saturday, 3:30 p.m.-5:30 p.m. This course will cover many aspects of facilitating research by undergraduates, such as getting students involved in research, finding appropriate problems, deciding how much help to provide, and presenting and publishing the results. Similarities and differences between research conducted during summer programs and research that can be conducted during the academic year will be discussed. Although the examples used will be primarily in the area of discrete mathematics, the strategies discussed can be applied to any area of mathematics.

**Minicourse #10:** *The hitchhiker's guide to mathematics*, organized by **Dan Kalman**, American University, and **Bruce F. Torrence**, Randolph Macon College. Part 1: Thursday, 9:00 a.m.-11:00 a.m.; Part 2: Saturday, 9:00 a.m.-11:00 a.m. A guided tour of some little known attractions of elementary mathematics, wonders to surprise, delight, and intrigue the mathematical eye. Some may make great enrichment topics for the participants' students, but the course's primary motivations are the edification and enjoyment of the participants themselves. The Hitchhiker's Guide to Mathematics answers questions like these: What does the quadratic formula have to do with the functions  $\max(x,y)$  and  $\min(x,y)$ ? For which rational  $x$  is  $\sin^2 x$  rational? What is the point of reversing a polynomial and its derivative, and then dividing one into the other? What are palindromic polynomials, and how can they be solved

up to degree 9? Participants are encouraged to bring a calculator.

**Minicourse #11:** *The mathematics of Islam and its use in the teaching of mathematics*, organized by **Victor J. Katz**, University of the District of Columbia. Part 1: Wednesday, 2:15 p.m.-4:15 p.m. Part 2: Friday, 2:15 p.m.-4:15 p.m. In the current world situation, it is critical that American students be exposed to some of the culture of Islam. Thus, this minicourse introduces college teachers to the mathematics of Islam and develops some ideas on using Islamic mathematical ideas in the teaching of mathematics. The course will consider mathematical ideas taken from arithmetic, algebra, geometry, and trigonometry. Participants will read from some of the original sources and discuss the ideas and their implications. In particular, we will consider how some of the examples of Islamic mathematics can be used in modern courses in high school and college.

**Minicourse #12:** *Learning discrete mathematics via historical projects*, organized by **Jerry Lodder**, **Guram Bezhanishvili**, and **David J. Pengelley**, New Mexico State University. Part 1: Wednesday, 2:15 p.m.-4:15 p.m., Part 2: Friday, 2:15 p.m.-4:15 p.m. This minicourse will introduce curricular modules, based entirely on primary historical source material, for courses in discrete mathematics, combinatorics, logic, and computer science. The modules have been authored by an interdisciplinary team of mathematics and computer science faculty at New Mexico State University and Colorado State University at Pueblo. In the first session we will discuss the pedagogy behind our approach, give a brief outline of the compendium of projects, and provide initial hands-on participant work using four chosen projects. In the second session we will discuss the four projects in detail, lead group discussions, and offer more interactive activities. The projects we have developed so far, as well as our philosophy in teaching with historical sources, can be found on our home page at <http://www.cs.nmsu.edu/historical-projects/>.

**Minicourse #13:** *Taking symbols seriously: Teaching form and function in college algebra*, organized by **William G. McCallum**, University of Arizona; **Deborah Hughes Hallett**, University of Arizona and Harvard University; and **Pat Shure**, University of Michigan. Part 1: Wednesday, 9:00 a.m.-11:00 a.m. Part 2: Friday, 9:00 a.m.-11:00 a.m. In this minicourse we will focus on the symbolic aspects of algebra, not the graphical or numerical aspects, giving participants a framework for developing symbolic literacy. We believe procedural fluency requires a foundation of conceptual understanding. We will help participants characterize the kind of understanding we would like to see in our students, and to design courses that promote such understand-

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ing. We will give participants the opportunity to construct questions that probe student understanding and to develop examples that demonstrate the importance of college algebra for later coursework in the physical and social sciences.

### MAA Contributed Paper Sessions

*The Arts and Mathematics*, Friday and Saturday afternoons, **Douglas E. Norton**, Villanova University. Sponsored by the Special Interest Group of the MAA on Math and the Arts.

*Developmental Mathematics Education: Helping Under-Prepared Students Transition to College-Level Mathematics*, Wednesday and Thursday afternoons, **Kimberly J. Presser** and **J. Winston Crawley**, Shippensburg University.

*Engaging Students with Classroom Voting*, Thursday morning, **Derek Bruff**, Vanderbilt University, **Kien Lim**, University of Texas at El Paso, and **Kelly Cline**, Carroll College.

*Experiences that Enrich the Education of Mathematics Majors*, Wednesday afternoon and Thursday morning, **Suzanne M. Lenhart**, University of Tennessee, **Steven J. Schlicker**, Grand Valley State University, **J. Douglas Faires**, Youngstown State University, and **Michael J. Dorff**, Brigham Young University. Sponsored by the MAA CUPM Subcommittee on Research by Undergraduates.

*How Assessment Results Changed Our Program*, Thursday afternoon, **Dick Jardine**, Keene State College, and **Barbara Edwards**, Oregon State University.

*Improving a Second Course in Statistics*, Wednesday morning, **Nancy J. Boynton**, SUNY Fredonia, **Patricia B. Humphrey**, Georgia Southern University, and **Michael A. Posner**, Villanova University. Sponsored by the SIGMAA on Statistics Education. Presenters in the session will be considered for the SIGMAA on Statistics Education's Best Contributed Presentation Award.

*Innovative and Effective Ways to Teach Linear Algebra*, Saturday morning and afternoon, **David M. Strong**, Pepperdine University, **Gilbert Strang**, Massachusetts Institute of Technology, and **David C. Lay**, University of Maryland.

*The MAA SUMMA Program Turns 20—A Retrospective*, Wednesday afternoon, **William A. Hawkins Jr.**, MAA and the University of the District of Columbia, **Efraim Armendariz**, University of Texas at Austin, **Camille A. McKayle**, University of the Virgin Islands, and **Robert E. Megginson**, University of Michigan, Ann Arbor. Cosponsored by SUMMA and the Committee on Minority Participation in Mathematics.

*Mathematical Texts: Famous, Infamous, and Influential*, Wednesday morning and afternoon, **Fernando Q. Gouv  a**, Colby College, and **Amy Shell-Gellasch**,

Beloit College. This session is an extension of the MAA Short Course.

*Mathematics and Sports*, Friday afternoon and Saturday morning, **Howard L. Penn**, U.S. Naval Academy.

*Mathematics Courses for the Liberal Arts Student*, Thursday and Friday mornings and Thursday afternoon, **Reva Kasman**, Salem State College.

*Mathematics, Equity, Diversity, and Social Justice*, Thursday and Friday mornings, **Patricia Hale**, California State Polytechnic University Pomona, **Shandy Hauk**, University of Northern Colorado, and **Dave Kung**, St. Mary's College, Maryland.

*Mathematics Experiences in Business, Industry and Government*, Thursday morning, **Philip Gustafson**, Mesa State College, and **Michael Monticino**, University of North Texas. Sponsored by the MAA Business, Industry and Government Special Interest Group (BIG SIGMAA).

*Mathlets for Teaching and Learning Mathematics*, Saturday afternoon, **Joe Yanik**, Emporia State University, **Thomas E. Leathrum**, Jacksonville State University, and **David M. Strong**, Pepperdine University. The Mathlets introduced in this session will be available at <http://cs.jsu.edu/~leathrum/JMMsession2010.html>. Sponsored by the MAA Committee on Technology in Mathematics Education (CTiME).

*My Most Successful Math Club Activity*, Wednesday morning, **Jacqueline A. Jensen**, Sam Houston State University, **Deanna B. Haunsperger**, Carleton College, and **Robert W. Vallin**, Slippery Rock University and the MAA. Sponsored by the MAA Committee on Undergraduate Student Activities and Chapters.

*Online Homework—Innovation and Assessment*, Thursday and Friday afternoons and Friday morning, **Michael E. Gage**, **Arnold K. Pizer**, and **Vicki Roth**, University of Rochester.

*Philosophy of Mathematics for Working Mathematicians*, Friday afternoon, **Bonnie Gold**, Monmouth University, and **Carl Behrens**, Alexandria, Virginia. Sponsored by the SIGMAA for the Philosophy of Mathematics.

*Preparing K-12 Teachers to Teach Algebra*, Wednesday and Thursday afternoons, **Elizabeth Burroughs**, Montana State University, **Angela M. Hodge**, North Dakota State University, and **William G. McCallum**, University of Arizona. Sponsored by the MAA Committee on the Mathematical Education of Teachers (COMET).

*Publishing Mathematics on the Web*, Friday afternoon, **Thomas E. Leathrum**, Jacksonville State University, **William F. Hammond**, The University at Albany, and **Kyle T. Siegrist**, University of Alabama in Huntsville. Sponsored by the MAA Committee on Technology in Mathematics Education (CTiME).

*Quantitative Reasoning and the Environment*, Friday morning, **Maura B. Mast**, University of Massachusetts Boston, **Karen D. Bolinger**, Clarion University, and **Cinnamon Hillyard**, University of Washington Bothell. Jointly sponsored by SIGMAA-EM and SIGMAA-QL.

*Research on the Teaching and Learning of Undergraduate Mathematics*, Friday and Saturday afternoons, **Keith Weber**, Rutgers University, **Stacy Brown**, Pitzer College, **Natasha A. Speer**, University of Maine, and **Karen A. Marrongelle**, Portland State University. Sponsored by SIGMAA on RUME

*The Scholarship of Teaching and Learning in Undergraduate Mathematics*, Wednesday morning and afternoon, **Edwin P. Herman**, and **Nathan M. Wodarz**, University of Wisconsin-Stevens Point.

*Undergraduate Mathematical Biology*, Friday morning and afternoon, **Timothy D. Comar**, Benedictine University, and **Raina S. Robeva**, Sweet Briar College. Sponsored by the BIO SIGMAA.

*Using Computer Algebra Systems in the Calculus Sequence*, Thursday morning, **William Marion**, Valparaiso University.

*Visualization in Mathematics*, Saturday morning and afternoon, **Sarah J. Greenwald**, Appalachian State University, and **Walter Whiteley**, York University.

*Wavelets in Undergraduate Education*, Thursday afternoon, **Caroline Haddad**, SUNY Geneseo, **Catherine Beneteau**, University of South Florida, **David Ruch**, Metropolitan State College of Denver, **Patrick Van Fleet**, University of St. Thomas.

*General Contributed Paper Sessions*, Wednesday, Thursday, Friday, and Saturday mornings and afternoons, **Eric S. Marland**, Appalachia State University, and **Daniel J. Curtin**, Northern Kentucky University.

## MAA Panels, Posters, and Other Sessions

**Mathematical Collaborations With Other Disciplines: Research Partnerships and Interdisciplinary Programs**, Wednesday, 9:00 a.m.-10:20 a.m., organized by **Joseph Malkevitch**, York College (CUNY). The goal of this panel is to explore how mathematicians and mathematics departments can initiate mutually beneficial research collaborations and interdisciplinary (degree) programs with other disciplines. The panel, including **Steven Brams**, New York University; **Susan L. Ganter**, Clemson University; **James G. Glimm**, SUNY at Stony Brook; and **Suzanne M. Lenhart**, University of Tennessee, will describe successful efforts in starting such collaborations, the difficulties one encounters in such collaborations, and offer advice about starting such collaborations. Sponsored by Mathematics Across the Disciplines Subcommittee of CUPM.

**National Science Foundation Programs Supporting Learning and Teaching in the Mathematical Sciences**, Wednesday, 9:00 a.m.-10:20 a.m., organized by **Henry Warchall**, NSF/DMS; **Karen A. Marrongelle**, NSF/DRL; and **Dennis Davenport**, **Daniel Maki**, and **Lee Zia**, NSF/DUE. A number of NSF divisions offer a variety of grant programs that support innovations in learning and teaching in the mathematical sciences. These programs will be discussed by the organizers/panelists along with examples of successful projects. Anticipated budget highlights and other new initiatives for the next fiscal year will also be presented.

**Cultivating Mathematical Interest and Talent of Precollege Students: Outreach through Summer Math Camps and Academies**, Wednesday, 2:15 p.m.-3:35 p.m., organized by **Michelle L. Christ**, U.S. Air Force Academy. This session explores some of the various outreach activities undertaken by faculty members to encourage and cultivate mathematical talent and interest of precollege students at both the middle and high school levels. In particular panelists **David Boliver**, University of Central Oklahoma; **Peter Kuchment**, Texas A&M University; **Lisa Rezac**, University of St. Thomas; **Hortensia Soto-Johnson**, University of Northern Colorado; and **Max L. Warshauer**, Texas State University, will focus on summer math camps and academies, especially those that are run primarily as outreach activities rather than as tuition-based. We will discuss motivations, logistics, activities, funding, results, and lessons learned.

**Project NExT/Young Mathematicians' Network Poster Session**, Wednesday, 2:15 p.m.-4:15 p.m., organized by **Kim Roth**, Juniata College, and **Michael C. Axtell**, University of St. Thomas. This poster session is intended to highlight the research activities, both mathematical and pedagogical, of recent or future Ph.D.s in mathematics and related fields. The organizers seek to provide an open venue for people who are near completion, or have finished their graduate studies in the last five years to present their work and make connections with other same-stage professionals, in much the same spirit as the YMN and Project NExT. The posterboard size will be 48" by 36". Posterboards and materials for posting pages on the posters will be provided on site. If you are interested in participating, submit copies of your abstract to [maxtell@stthomas.edu](mailto:maxtell@stthomas.edu) and [roth@juniata.edu](mailto:roth@juniata.edu).

**How to Interview for a Job in the Mathematical Sciences**, Wednesday, 3:50 p.m.-5:10 p.m., organized by **David C. Manderscheid**, University of Nebraska-Lincoln. This session is aimed at Ph.D. students and at recent graduates. An overview of the employment process will be given with ample opportunity for participants to ask questions. The

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emphasis will be on the portion of the employment process from interviewing through accepting an offer. Questions that will be addressed include: How do employers conduct interviews? How can you best prepare for these interviews? How do employers choose to whom they will make offers? How do you negotiate once you have an offer? How do you choose among competing offers? Panelists include **Allen Butler**, Daniel H. Wagner Associates, Inc.; **Sharon Mosgrove**, Concordia University; **James Freeman**, Cornell College; **David C. Manderscheid**; and **Sarah Ann Stewart**, Belmont University. Sponsored by the MAA Committee on Graduate Students and the Young Mathematicians' Network.

**Session for Department Chairs: Assessment of Student Learning Outcomes—Opportunity and Challenge**, Thursday, 9:00 a.m.-10:20 a.m., organized by **Daniel P. Maki**, Indiana University, and **Catherine M. Murphy**, Purdue University Calumet. In the past decade accrediting agencies, both disciplinary and regional, have developed outcomes-based criteria. Responding to the requirement for articulating desired student learning outcomes so they are measurable and choosing measures that are sustainable is a challenge. The process a department goes through to meet the challenge and the insights gained from the collected data provides an opportunity for departments to think deeply about their curriculum and make appropriate changes. Panelists **Jay A. Malmstrom**, Oklahoma City Community College; **Catherine M. Murphy**; and **Nalsey B. Tinberg**, Occidental College, will address three major areas: what do regional accrediting agencies expect; what MAA resources on assessment are available to support mathematical sciences departments; and an example of how even imperfect measures can provide valuable insights both about one's programs and how to improve the measures used. During the question and answer session, department chairs are invited to share their departments' experiences developing and implementing assessment of student learning processes.

**Online Articles From JOMA to Loci**, Thursday, 9:00 a.m.-10:20 a.m., organized by **Thomas E. Leathrum**, Jacksonville State University, and **Lawrence Moore**, Duke University. The MAA and MathDL online journal *Loci* was created in summer of 2008 by merging three earlier online publications of MathDL, the *Journal of OnlineMath and its Applications* (JOMA), Digital Classroom Resources (DCR), and Convergence. This panel will be moderated by the editor of *Loci*, and panelists will include authors representing different areas of *Loci* or its predecessor publications. Panelists are **Nathaniel Miller**, University of Northern Colorado; **Kady Scheiter**, Utah State University; and **Lee Stemkoski**, Adelphi University. This discussion seeks to encour-

age future authors to publish in *Loci*. Authors will discuss their experiences with publishing in *Loci*, in particular how writing and revising an article is different for an online publication. Sponsored by the MAA Committee on Technology in Mathematics Education (CTiME).

**Mathematical Outreach Programs For Underrepresented Populations**, Thursday, 9:00 a.m.-11:00 a.m., organized by **Elizabeth (Betsy) Yanik**, Emporia State University. This poster session is designed to showcase successful outreach mathematics programs that encourage students from underrepresented populations to continue their study of mathematics. The participants in such programs range in grade level from elementary students to graduate students. It is expected that posters representing a wide variety of programs and initiatives will be displayed. Possible projects include after-school clubs, special conferences, mentoring programs, summer camps, innovative courses, graduate seminars, etc. Those who are in the process of constructing an outreach program are especially encouraged to attend this session to acquire valuable insights and tips for designing and implementing a mathematics outreach project. Sponsored by the Women and Mathematics Network, a subcommittee of the MAA Committee on the Participation of Women.

**How One Can Become a Referee/Reviewer**, Thursday, 9:30 a.m.-10:50 a.m., organized by **Joseph A. Gallian**, University of Minnesota-Duluth; **Aparna W. Higgins**, University of Dayton; and **T. Christine Stevens**, Saint Louis University. Panelists **Matthias Beck**, San Francisco State University; **Frederick Hoffman**, Florida Atlantic University; **Carl Pomerance**, Dartmouth College; and **Brigitte Servatius**, Worcester Polytechnic Institute, will provide advice about refereeing papers for research and expository journals, writing reviews for *Math Reviews*, and reviewing book manuscripts for publishers. Topics to be addressed include how to write referee's reports and how to write reviews for *Math Reviews* or book publishers. The panelists will also discuss how much time refereeing and reviewing consume, how refereeing/reviewing "counts" in one's department for promotion and tenure, and how one can become a referee/reviewer. Sponsored by Project NExT.

**Proposal Writing Workshop for Grant Applications to the NSF Division of Undergraduate Education**, Thursday, 10:40 a.m.-noon, organized by **Dennis E. Davenport**, **Daniel P. Maki**, and **Lee L. Zia**, Division of Undergraduate Education, National Science Foundation. Presenters will describe the general NSF grant proposal process and consider particular details relevant to programs in the Division of Undergraduate Education. This interactive session will feature a series of "read/think/share/

report" exercises built around a series of short excerpts from sample proposals.

**Statistics=Mathematics: What A First (or Second) Time Teacher of Statistics Should Know**, Thursday, 1:00 p.m.-2:20 p.m., organized by **Michael A. Posner**, Villanova University. Instructors of introductory statistics are sometimes thrown into the classroom without much training on what to expect. One of the first things they learn is that statistics is not simply a field within mathematics. The Guidelines for Assessment and Instruction in Statistics Education (GAISE) report presents what statistically educated citizens should know as well as guidelines for achieving this learning. Many online resources are also available to assist in instruction and assessment in introductory statistics. New and seasoned statistics instructors **Robin Lock**, St. Lawrence University; **Elaine Newman**, Sonoma State University; **Leigh Lunsford**, Longwood University; and **Ken Torre**, Cotati-Rohnert Park Unified School District, will share advice and resources on what a first- (or second-) time teacher of statistics should know. Sponsored by the SIGMAA Stat Ed.

**Hard Problems, Approximate Solutions: Finding Balance between Math and Family Demands, Thursday**, 1:00 p.m.-2:30 p.m., organized by Kathleen M. O'Hara, Mathematical Sciences Research Institute. Virginia Wolf said it all in "A Room of One's Own." How do we find time for our own mathematical work amidst intergenerational family demands? The challenges of balancing family life (such as raising children, caring for elderly parents, providing child care for grandchildren, or supporting a partner) with a professional life are myriad.

This panel, the first in a series of panels on this issue, will focus on two approaches to a solution: successful institutional models that allow time for family responsibilities and personal frameworks that allow time for career goals. Panelists presenting the larger issues of family and work within academia include **Mary Ann Mason** and **Marc Goulden**, University of California, Berkeley, co-authors of the paper *Do Babies Matter? The Effect of Family Formation on the Lifelong Careers of Academic Men and Women*; and **Carol Hollenshead**, former director of the University of Michigan's Center for the Education of Women and co-author of *Developing and Implementing Work Family Policies for Faculty*. **Maura B. Mast**, University of Massachusetts, Boston, and **Judy L. Walker**, University of Nebraska, will provide perspectives on institutional and personal approaches to surviving the family-work crunch. Sponsored by the AMS-ASA-AWM-IMS-MAA-NCTM-SIAM Joint Committee on Women in the Mathematical Sciences.

**Poster Session of Projects Supported by the NSF Division of Undergraduate Education**, Thursday, 2:00 p.m.-4:00 p.m., organized by **Jon W. Scott**,

Montgomery Community College. This session will feature principal investigators (PIs) presenting progress and outcomes from various NSF-funded projects in the Division of Undergraduate Education. The poster session format will permit ample opportunity for attendees to engage in small group discussions with the PIs and to network with each other. Information about presenters and their projects will appear in the program.

**Excuse Me, Where is the Department of Statistics Education?** Thursday, 2:35 p.m.-3:50 p.m., organized by **Michael A. Posner**, Villanova University. Statisticians and non-statisticians alike are called upon to teach statistics courses to a growing number of college and high school students each year. Very few, however, are trained in interpreting student thinking and understanding and comparing the effectiveness of various pedagogical methods. Even fewer are doing research on how best to teach statistics. The goal of the statistics education field is to promote evidence-based statistics education research to guide the practice of teaching statistics and foster the organizational structures to promote systematic strands of research. A recent report proposes the creation of graduate statistics education programs identifying programmatic structures, discussing faculty support recommendations, and suggesting courses for inclusion in these interdisciplinary programs. This panel brings together those on the cutting edge of statistics education research along with mathematics educators who offer advice on what the statistics education community can learn from the field of mathematics education research. Panelists include **Dennis Pearl**, Ohio State University; **Mike Shaughnessy**, Portland State University; and **Bob delMas** and **Andrew Ziefle**, University of Minnesota. Sponsored by SIGMAA Stat Ed and SIGMAA RUME.

**More Voices from the Partner Disciplines: The Second Round of Curriculum Foundations Workshops**, Thursday, 2:35 p.m.-3:50 p.m., organized by **Sheldon P. Gordon**, Farmingdale State College. CRAFTY, the committee on Curriculum Renewal Across the First Two Years, with the cooperation of the committee on Mathematics Across the Disciplines, is currently organizing a second round of Curriculum Foundations workshops in which leading educators from different fields are brought together to develop recommendations on the current mathematical needs of their students. This round of workshops focuses on disciplines that historically were less math-intensive than the ones represented in the first round. The intent of the project is to promote discussions between mathematics departments and the associated partner disciplines that can lead to mathematics courses and programs that better serve the needs of the students majoring in

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the other fields. Panelists **Susan L. Ganter**, Clemson University; **Andrew G. Bennett**, Kansas State University; **Sheldon P. Gordon**; **William E. Haver**, Virginia Commonwealth University; and **William Marion**, Valparaiso University, will present some of the more important and perhaps surprising results and recommendations that emerged from the recent workshops in such diverse fields as agriculture, economics, meteorology, and sociology, which are responsible for a surprising number of the students in our courses. Sponsored by MAA CRAFTY.

**Mathematical Poetry Reading**, Thursday, 7:00 p.m.-9:00 p.m., organized by **Douglas Norton**, Villanova University. From the open readings by the Humanistic Mathematics Network in the 1990s to the "Poetry of Love and Mathematics: A Reading" in Washington last year, mathematicians have enjoyed sharing poetry at the Joint Mathematics Meetings. Come to share mathematical poetry of your own composition or simply of your liking in an "open mike" informal setting. Listen, read, talk, share, relax.

**Promotion and Tenure: You Know You Want It**, Friday, 9:00 a.m.-10:20 a.m., organized by **Barry A. Balof**, Whitman College, and **Joshua D. Laison**, Willamette College. Is the tenure process in your future? Are you anxious (probably) or unsure (possibly) about what lies ahead? This panel discussion and question/answer session will feature several of your colleagues who have recently been through the process, as well as some colleagues who have been on the other side making the decisions. Panelists include **Jason D. Rosenhouse**, James Madison University; **Francis E. Su**, Harvey Mudd College; **Matthew P. Richey**, St. Olaf College; and **Jacqueline A. Jensen**, Sam Houston State University. Sponsored by the MAA and the Young Mathematicians' Network.

**Becoming a Teacher of College Mathematics: Video Cases for Novice College Mathematics Instructor Professional Development**, Friday, 1:00 p.m.-3:00 p.m., organized by **John D. Eggers**, University of California San Diego; **Shandy Hauk** and **Mark Davis**, University of Northern Colorado; **Eric Hsu**, San Francisco State University; and **Natasha M. Speer**, University of Maine. Discussion, planning, and action to improve the opportunities for mathematics graduate student teaching assistants (TAs) to learn about teaching is on the rise. In addition to examining the factors that shape TAs' professional lives and their development as teachers of college mathematics, a national collaborative of mathematicians and mathematics education researchers, funded through the U.S. Department of Education FIPSE program have been capturing video of classroom, office hours, and tutoring sessions at colleges and universities around the U.S. This session will include: an introduction to the materials being developed by the College Math

Video Cases Project, a screening and discussion of video vignettes, and time for feedback to video case developers. The session will include the chance for attendees to meet and work with those who have published findings in the area of TA preparation. Panelists are **Eric Hsu**; **David E. Meel**, Bowling Green State University; and **Natasha M. Speer**. Sponsored by the AMS-MAA Committee on Teaching Assistants and Part-time Instructors (TA/PTI).

**Current Issues in Actuarial Science Education**, Friday, 5:00 p.m.-7:00 p.m., organized by **Robert E. Buck**, Slippery Rock University; **Bettye Anne Case**, Florida State University; Kevin E. Charlwood, Washburn University; and **Steve Paris**, Florida State University. A diverse group of working actuaries, publishers, and actuarial educators bring new information from professional society committees, specialized publications initiatives, and academic department experience. The pace of change is faster than in most academic areas, and the session helps faculty adjust as quickly as possible not only to educate their students generally, but give the students good professional information and to determine curriculum change that may be necessary. Panelists include **James W. Daniel**, University of Texas-Austin; **Bryan V. Hearsey**, Lebanon Valley College, and representatives from the actuarial societies; the panel will be moderated by **Robert E. Buck**. There will a discussion about organizing an MAA Special Interest Group on Actuarial Education or about reviving the Actuarial Faculty Forum. Sponsored by actuarial educators, Society of Actuaries, Casualty Actuarial Society, and ACTEX Publications.

**The Theater of the Mathematically Absurd**, Friday, 6:00 p.m.-7:00 p.m., presented by **Colin Adams** and the **Mobiusbandaid Players**. This theatrical presentation of short, humorous, mathematically-related pieces, including "Happiness is a Warm Theorem," "Immortality", and "The Lord of the Rings: The NSF Fellowship of the Ring" requires no particular math or theatrical background in order to thoroughly enjoy oneself.

**Beyond Grading and Tutoring: New Approaches to Students Helping Students**, Saturday, 9:00 a.m.-10:20 a.m., organized by **Daniel E. Flath**, Macalester College; **Lewis D. Ludwig**, Denison University; and **Steven R. Benson**, Lesley University. Many departments use juniors and seniors as graders or tutors, but some programs involve undergraduates helping fellow undergraduates in mathematics in ways beyond these two methods. Panel members **Sonny Painter**, University of Missouri-Kansas City; **Karen Saxe**, Macalester College; and **Catherine A. Beneteau**, University of South Florida, describe successful experiences with three approaches, including training of student assistants and the student

perspective. Sponsored by the MAA Committee for the Teaching of Undergraduate Mathematics.

**Technology in Teaching Mathematics: History and Current Practices**, Saturday, 1:00 p.m.-3:55 p.m. (presented in two consecutive parts), organized by **Marilyn A. Reba**, Clemson University, and **Lila F. Roberts**, Georgia College & State University. Software trends (Assembly language, FORTRAN, BASIC, Pascal, C, higher level pre-packaged software like spreadsheets, CAS, and geometry software), hardware trends (mainframes, terminals, personal computers, portable computers, calculators, Ipods, tablets), and the growth of Internet have revolutionized mathematics teaching. The panel session will focus on how technologies have evolved over the past thirty years to become beneficial tools in the mathematics classroom. In the first part of the session, panelists will discuss how changing technology has altered how we teach calculus, differential equations, linear algebra, statistics, and probability. There will be a break halfway through this session. In the second part, panelists will focus on how the growth of the Internet and Web-based software has changed our teaching materials and how we communicate about mathematics in and out of the classroom. Sponsored by the MAA Committee on Technology in Mathematics Education (CTiME).

### **Project NExT Sessions**

Project NExT (New Experiences in Teaching) is the MAA's professional development program for new and recent Ph.D.s in the mathematical sciences. Each year, about seventy new faculty are selected as Project NExT Fellows; application information for 2010-2011 is available at the Project NExT booth in the exhibit area.

The following sessions were organized by the 1994-2005 Project NExT Fellows to address issues of concern to faculty who have four to ten years of teaching experience. All meeting participants are invited to attend.

**Teaching Calculus to Students who Have Had AP Calc: Challenges and Solutions**, Thursday, 8:00 a.m.-9:15 a.m., organized by **Timothy P. Chartier**, Davidson College, and **Stephanie Salomone**, University of Portland. The population of a college calculus class can range from students who have seen calculus through the AP program to students who are seeing the topics for the first time. Some students have seen a subset of the material of the class. Further, students with AP credit can vary widely in the depth of their mathematical training, from familiarity with the mechanics of calculus to an understanding of the theory behind the mechanics. The AP Calculus program can serve as a springboard into college-level mathematical training for strong mathematical students. At the same time,

AP training of calculus students can offer a variety of challenges in the calculus classroom. This session will discuss such challenges and innovative ideas and solutions. Panelists include **Michael E. Boardman**, Pacific University; **David M. Bressoud**, Macalester College; **Stephen L. Davis**, Davidson College; **Deborah Hughes-Hallett**, University of Arizona; and **Francis E. Su**, Harvey Mudd College.

**Mathematics and Social Justice**, Thursday, 2:30 p.m.-3:45 p.m., organized by **Lily S. Khadjavi**, Loyola Marymount University, and **David T. Kung**, St. Mary's College of Maryland. Panelists **Shandy Hauk**, University of Northern Colorado; **Eric Hsu**, San Francisco State University; and **Lisa Marano**, West Chester University, will focus on issues at the intersection of mathematics and social justice. In particular, panelists will discuss three ways in which we, as mathematicians, can address issues of social justice: curricula that focus on social justice issues, programs that focus on social justice within the mathematics world (e.g., Treisman's Emerging Scholars Programs for college students and other efforts to level the playing field within mathematics), and culturally responsive pedagogy and ways to make our classrooms more equitable.

**Organizing and Running an Effective Seminar/Capstone Course for Mathematics Majors**, Saturday, 2:00 p.m.-3:15 p.m., organized by **Karrolyne Fogel**, California Lutheran University, **Russell Goodman**, Central College, and **Thomas Langley**, Rose-Hulman Institute of Technology. Many universities have a capstone/seminar course or experience for their mathematics majors, designed to provide a community of mathematics majors with a meaningful experience beyond textbook mathematics. These experiences vary widely from institution to institution depending on student ability and department culture. Panelists **Mariah Birgen**, Wartburg College; **Lipika Deka**, California State University-Monterey Bay; **Nezam Iraniparast**, Western Kentucky University; and **Brian Miceli**, Trinity University, will describe their departments' courses and support mechanisms, thereby presenting us with a variety of perspectives and ideas on ways to structure a culminating experience.

### **Special Interest Groups of the MAA (SIGMAAs)**

SIGMAAs will be hosting a number of interesting activities, sessions, and guest lecturers. There are currently nine such focus groups offering members opportunities to interact not only at meetings but throughout the year via newsletters and email-based communications. For more information visit [www.maa.org/SIGMAA/SIGMAA.html](http://www.maa.org/SIGMAA/SIGMAA.html).

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**SIGMAA Officers Meeting**, Thursday 10:30 a.m.-noon, chaired by Amy Shell-Gellasch, Beloit College.

### SIGMAA on Business, Industry, and Government

*Mathematics Experiences in Business, Industry, and Government*, Thursday morning (see the “MAA Contributed Paper Sessions” section).

**Guest Lecture**, Thursday, 5:45 p.m. by Barry Cipra, Northfield, MN, *From Netflix to Gerrymanders: A sample of BIG applications of mathematics*.

See information on a reception on Thursday evening in the “Social Events” section.

### SIGMAA on the History of Mathematics

*Mathematical Texts: Famous, Infamous, and Influential*, Saturday morning (see the “MAA Contributed Paper Sessions” section).

**Business Meeting and Reception**, Wednesday, 5:30 p.m.-6:30 p.m.

**Guest Lecture**, Wednesday, 6:30 p.m.-7:30 p.m., Reviel Netz, Classics Department, Stanford University, *The Archimedes Palimpsest and Its Infinite Possibilities*.

### SIGMAA on Statistics Education

*Improving a Second Course in Statistics*, Wednesday morning (see the “MAA Contributed Paper Sessions” section).

*Statistics ≠ Mathematics: What A First- (or Second-) Time Teacher of Statistics Should Know*, Thursday, 1:00 p.m.-2:20 p.m. (see the “MAA Panels, Posters, and Other Sessions” section).

*Excuse Me, Where Is the Department of Statistics Education?* Thursday, 2:35 p.m.-3:50 p.m. (see the “MAA Panels, Posters, and Other Sessions” section).

**Business Meeting and Reception**, Thursday, 5:45 p.m.- 7:15 p.m.

### SIGMAA on Mathematical and Computational Biology

*Undergraduate Mathematical Biology*, Friday morning (see the “MAA Contributed Paper Sessions” section).

**Business Meeting**, Friday, 6:00 p.m.-7:00 p.m.

**Guest Lecture**, Friday, 7:00 p.m.-8:00 p.m., Alan Hastings, University of California Davis, *Using mathematical approaches to understand and manage spatially distributed populations: From invasive species to fisheries*.

### SIGMAA on Math Circles

**Business Meeting**, Wednesday, 5:30 p.m.-6:30 p.m.

*Fostering, Supporting, and Propagating Math Circles*, Thursday, 1:00 p.m.-4:15 p.m., and Satur-

day, 1:00 p.m.-5:00 p.m., organized by James S. Tanton, St. Mark’s Institute of Mathematics, and Tatiana Shubin, San Jose State University. A math circle is broadly defined as a semiformal, sustained enrichment experience that brings mathematics professionals in direct contact with pre-college students and/or their teachers. They foster passion and excitement for deep mathematics. This session explores issues of conducting, supporting, and propagating math circle activity and welcomes all interested in learning about this work. Along with lectures, displays, and discussions, a demonstration class with local school students will be given during this session.

### SIGMAA on Mathematics Instruction Using the Web

**Reception and Business Meeting**, Thursday, 5:45 p.m.-6:30 p.m.

*Life after Wolfram Alpha*, Thursday, 6:30 p.m.-7:30 p.m., Bruce W. Yoshiwara, Pierce College, will give this presentation and lead a discussion.

### SIGMAA Quantitative Literacy

*Quantitative Reasoning and the Environment*, Friday morning (see the “MAA Contributed Paper Sessions” section).

**Business Meeting**, Friday, 5:00 p.m.-6:00 p.m.

### SIGMAA on the Philosophy of Mathematics

*Philosophy of Mathematics for the Working Mathematician*, Friday afternoon (see the “MAA Contributed Paper Sessions” section).

**Business Meeting and Reception**, Friday, 5:15 p.m.-6:15 p.m.

**Guest Lecture**, Friday, 6:15 p.m.-7:15 p.m. Charles Chihara, Philosophy Department, University of California Berkeley, *What is Philosophy of Mathematics? A Case Study of Fictionalism*.

### SIGMAA Environmental Mathematics

**Guest Lecture**, Thursday, 5:30 p.m.-6:30 p.m. speaker and title to be announced.

**Business Meeting**, Thursday, 6:30 p.m.-7:30 p.m.

*Quantitative Reasoning and the Environment*, Friday morning (see the “MAA Contributed Paper Sessions” section).

*Environmental Mathematics*, Thursday morning (see the “MAA Invited Paper Sessions” section).

### SIGMAA on Mathematics and the Arts

**Business Meeting**, Friday, 7:00 p.m.-8:00 p.m.

**The Art of Bruce Beasley**, Friday, 8:00 p.m.-9:00 p.m. Come meet this internationally known artist as he discuss his sculptures that feature multiple intersecting forms developed using a computer program.

Images of Bruce Beasley's sculptures can be seen at [www.brucebeasley.com/home.htm](http://www.brucebeasley.com/home.htm). An article on his works appeared in the December 2006 issue of *Hyperseeing*, [www.isama.org/hyperseeing/](http://www.isama.org/hyperseeing/).

*Mathematical Poetry Reading*, Thursday, 7:00 p.m.–9:00 p.m. (see the "MAA Panels, Posters, and Other Sessions" section)

*The Arts and Mathematics*, Saturday afternoon (see the "MAA Contributed Paper Sessions" section).

### SIGMAA on Research and Undergraduate Mathematics Education

*Excuse Me, Where Is the Department of Statistics Education?* Thursday, 2:35 p.m.–3:50 p.m. (see the "MAA Panels, Posters, and Other Sessions" section).

**Business Meeting**, Thursday, 6:00 p.m.–7:30 p.m.

*Research on the Teaching and Learning of Undergraduate Mathematics*, Friday afternoon (see the "MAA Contributed Paper Sessions" section).

### MAA Sessions for Students

**Grad School Fair**, Friday, 8:30 a.m.–10:30 a.m. Here is the opportunity for undergrads to meet representatives from mathematical sciences graduate programs from universities all over the country. January is a great time for juniors to learn more, and college seniors may still be able to refine their search. This is your chance for one-stop shopping in the graduate school market. At last year's meeting about 300 students met with representatives from 45 graduate programs. If your school has a graduate program and you are interested in participating, a table will be provided for your posters and printed materials for US\$50 (registration for this event must be made by a person already registered for the JMM), and you are welcome to personally speak to interested students. Complimentary coffee will be served. Cosponsored by the AMS and MAA.

**Graduate School: Choosing One, Getting In, Staying In**, Thursday, 10:40 a.m.–12:00 noon., organized by **Kristi Meyer**, Wisconsin Lutheran College, and **Aaron Luttman**, Clarkson University. With so many graduate school choices and so much information available online, how do you decide on a list of schools to apply to? How can you strengthen your application so you will be accepted into a program? How do you choose which school to attend? And once you've started a program, how do you successfully navigate grad school and complete your degree? Panelists **Richard McGehee**, University of Minnesota, and **Scott Lambert**, Colby College, will discuss these and other important issues for those students who are considering a graduate degree or thinking about switching graduate programs. Cosponsored by the MAA and the Young Mathematicians' Network.

**Finding a Research Topic and Thesis Advisor**, Thursday, 1:00 p.m.–2:20 p.m., organized by **David C. Manderscheid**, University of Nebraska-Lincoln, and **Aaron Luttman**, Clarkson University. Complex analysis, matroid theory, time scale analysis, or mathematical biology? One of the most important and far-reaching decisions that every graduate student in mathematics must make is what direction of mathematical research to pursue and whom to ask to serve as a thesis advisor. Many students are interested in a variety of areas of mathematics, and choosing a singular area of focus can be difficult. Panelists **Raegan J. Higgins**, Texas Tech University; **Franziska Hinckelmann**, Virginia Polytechnic Institute and State University; **Steven G. Krantz**, Washington University; and **Jennifer McNulty**, University of Montana, four experts in various stages of their mathematical careers, will discuss what factors have influenced their decisions of what research to explore, whom to ask to be their advisor, and whom to take on as graduate students. This panel discussion is aimed at early-career graduate students and undergraduate students who are planning to attend graduate school. Sponsored by the MAA Committee on Graduate Students and the Young Mathematicians' Network.

**Low-Dimensional Topology for Fun and Profit, or How to Extract Money from the R<sup>4</sup> Space**, Thursday, 6:00 p.m.–7:00 p.m., presented by **Cliff Stoll**, Acme Klein Bottle Company. For over ten years, Acme Klein Bottle has provided nonorientable manifolds to math folk. Like much of mathematics, it's marginally profitable, but endlessly entertaining. While thousands of computer models of the Klein Bottle populate the Internet, physical models are rarely built. Using Pyrex glass and a torch, we've been able to supply the finite but unbounded demand for one-sided, R<sup>3</sup> immersed Klein Bottles. Along the way, we've learned how run a microbusiness within this smallest of niche markets. Our experience may be useful to mathematicians who think about becoming entrepreneurs. So how do you turn your mathematical ideas into a small business? Come to Cliff's talk and find out! Cliff will be available for an informal "meet the speaker" chat after the conclusion of his presentation.

**MAA Lecture for Students**, Friday, 1:00 p.m.–1:50 p.m., will be given by **David T. Kung**, St. Mary's College of Maryland, on *How math made modern music mad Irrational!* Join David for an information chat and "meet the speaker" event to be held right after the lecture (2:00 p.m. to 2:30 p.m.) in the Student Hospitality Center on the second level of Moscone, near the Invited Address Lecture room.

**Undergraduate Student Poster Session**, Friday, 4:00 p.m.–5:30 p.m., organized by **Diana M. Thomas**, Montclair State University. The session is reserved

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to undergraduates and first-year graduate students submitting posters on work done while undergraduates. Abstracts are accepted on a first-come basis. Space is limited and students are encouraged to apply early. Beginning August 1, 2009, students can submit abstracts online at [www.maa.org/students/undergrad/poster09.htm](http://www.maa.org/students/undergrad/poster09.htm). Examples of poster topics include a new result, a different proof of a known theorem, an innovative solution of a Putnam problem, a new mathematical model, or method of solution of an applied problem. Purely expository posters cannot be accepted. Prizes will be awarded to the top-rated posters with money provided by the AMS, MAA, AWM, CUR, PME, and by the Moore Foundation. Trifold, self-standing 48" by 36" tabletop posterboards will be provided. Additional material or equipment is the responsibility of the presenters. Questions regarding this session should be directed to Diana Thomas at [thomasdia@mail.montclair.edu](mailto:thomasdia@mail.montclair.edu). The deadline for proposals is **November 7, 2009**. Cosponsored by the MAA-CUPM Subcommittee on Undergraduate Research and the MAA Committee on Undergraduate Student Activities and Chapters (CUSAC).

Some more advanced students might be interested in the session on **How to Interview for a Job in the Mathematical Sciences**, Wednesday at 3:50; see the full description in the "MAA Panels..." section.

Also see the "Social Events" section for the open hours of the **Student Hospitality Center** and the **Reception for Undergraduates**.

### MAA Short Course

This two-day Short Course on *Exploring the Great Books of Mathematics* is organized by **Amy Shell-Gellasch**, Beloit College, and **Glen Van Brummelen**, Quest University, and will take place on Monday and Tuesday, January 11 and 12. The MAA Short Course is partially supported by the Raymond Brink Fund.

Every intellectual endeavor has key moments when some new monumental work shakes its foundations and builds new ones. How these great books affect the future might be clear within months of publication, or may take centuries to develop; in ways we may not even fully recognize, they shape our thoughts. We shall concentrate on only four great books in mathematics, spending half a day on each. We shall delve deeply into the texts, translations, and commentaries, do some reading in each of the original texts, and consider their influences on later generations.

The speakers and their talks:

**Alex Jones**, New York University, *Ptolemy's Almagest: Greek mathematics and the heavenly bodies*. Ptolemy wrote his textbook on astronomy, the *Almagest*, in Alexandria around A.D. 150 at the

peak of the Roman Empire. In this book he adapted the geometry of the Greeks and the arithmetic of the Babylonians to the problems of finding an accurate, quantitative description of the movements of the Sun, Moon, stars, and planets. We will explore how Ptolemy uses such resources as a place-value notation for precise numerical data, trigonometrical functions, and recursive algorithms to the deduction of how our universe works, resulting in a cosmology that remained the standard one for more than a thousand years.

**George Smith**, Tufts University, *Newton's Principia*. Isaac Newton had developed the calculus to an impressive point by 1671, yet in his *Principia* of 1687 he resorts instead to a form of geometry incorporating limits. That has raised a question about the extent to which his knowledge of the calculus informed the mathematics of the *Principia*—a question that has received such dubious answers as "he did it all first in the calculus and then transformed it into geometry." The diversity of mathematical techniques in the *Principia*, however, makes simple answers to the question impossible. The *Principia* lays out a sustained empirical argument. The diversity of mathematical techniques in it stems from the specific problems for which that argument required mathematical solutions. The course will accordingly first lay out the structure of the argument in the *Principia*, so that attendees can see why each of the proved propositions and lemmas is in the book. It will then examine a selection of propositions central to the argument, each demanding its own distinctive mathematical techniques. The goal will be to put attendees in position to assess for themselves the extent of the influence Newton's mastery of the calculus had on the mathematics at different places in the *Principia*.

**Ivor Grattan-Guinness**, Middlesex University Business School, *Tracking the great writings of mathematics*. In 2005 Elsevier published a book that I edited, *Landmarks in Western Mathematics, 1640–1940*, 1050 pages. In it 77 articles recorded the history of 89 books or papers that substantially influenced the development of mathematics in some way or another over the chosen period. In this lecture I shall review the means by which the writings were chosen, and the various forms of influence that had to be appraised. The difficulties of assessing the impact and influence itself will be emphasized.

**Robert E. Bradley**, Adelphi University, and **Ed Sandifer**, Western Connecticut State College, *Cauchy and the Cours d'analyse*. Cauchy's *Cours d'analyse de l'École royale polytechnique* is often cited as the beginning of modern rigor in mathematics. It is also said that Cauchy wrote the book to improve the teaching of calculus, and that Cauchy was a very unpopular teacher. How rigorous was the

*Cours d'analyse?* How different is it from what came before, and from what we use today? Is it a calculus book or an analysis book? Could we (or should we) teach from it today? Why has it never been translated into English? Is it just another “book nobody read”?

**Fernando Q. Gouv  a**, Colby College, *How algebra became modern*. B. L. van der Waerden's *Moderne Algebra* was both an account of and a manifesto for a new approach to algebra. It quickly established the new “abstract” or “structural” approach as the dominant way to understand the subject. It also pretty much created a subject, “modern algebra”, that eventually established itself as a standard part of undergraduate mathematics education. We will look at the context and influence of the book, comparing it with other contemporary books and attempting to get a measure of its impact.

There are separate registration fees to participate in this Short Course. See the fee schedule on the registration form at the back of this issue or visit [www.ams.org/amsmtgs/2124\\_reg.html](http://www.ams.org/amsmtgs/2124_reg.html).

## Other MAA Events

**Board of Governors**, Tuesday, 9:00 a.m.–5:00 p.m.

**New Committee Chairs Workshop**, Tuesday, 7:00 p.m.–9:00 p.m., organized by **Barbara J. Faires**, MAA Secretary-Elect, and **Martha J. Siegel**, MAA Secretary. Are you an incoming chair of an MAA committee or a new editor of one of the MAA publications? This workshop will feature an orientation to MAA policies and procedures, as well as active participation in discussion of challenging situations that have occurred (and probably will occur) as committee chairs and editors go about the work of the association.

**Section Officers**, Wednesday, 2:30 p.m.–5:00 p.m.

**Business Meeting**, Saturday, 11:10 a.m.–11:40 a.m., organized by MAA Secretary, **Martha J. Siegel**, Towson University, and moderated by MAA President **David M. Bressoud**, Macalester College.

**Department Liaisons Meeting**, Wednesday, 9:30 a.m.–11:00 a.m.

**Minority Chairs Breakfast Meeting**, 7:00 a.m.–8:45 a.m., Saturday.

See the listings for various receptions in the “Social Events” section.

## MAA Ancillary Workshops

Two workshops have been organized for presentation on Tuesday, January 12, before the Joint Mathematics Meetings actually begin. They will be held in the San Francisco Marriott Hotel. There is no cost to participate. To apply see [www.causeweb.org/workshop](http://www.causeweb.org/workshop).

**Teaching Introductory Statistics**, Tuesday, 8:30 a.m.–5:00 p.m., presented by **Carolyn K. Cuff**, West-

minster College, and **Michael A. Posner**, Villanova University. In May, 2005, the American Statistical Association endorsed the Guidelines for Assessment and Instruction in Statistics Education (GAISE). The guidelines were created to give sufficient structure to instructors and yet allow sufficient generality to include good practices in the many flavors of the first statistics course. The recommendations include:

1. Emphasize statistical literacy and develop statistical thinking;
2. Use real data;
3. Stress conceptual understanding rather than mere knowledge of procedures;
4. Foster active learning in the classroom;
5. Use technology for developing conceptual understanding and analyzing data; and
6. Use assessments to improve and evaluate student learning.

This workshop will consider the implementation of those guidelines in a first-level statistics course. What are the big ideas of statistics? How can those big ideas be communicated to students? What are effective evaluation and assessment tools? We will begin to answer those questions through considering ways to engage students in statistical literacy and thinking. The contrast between conceptual and procedural understanding will be explained using examples.

The workshop is meant for instructors new to teaching introductory statistics.

For most of the workshop, participants will engage in many of the classic activities that all statistics instructors should know. Different types of available technology will be demonstrated; different types of texts will be explored. Internet sources of real data, activities, and best practices articles will be examined. Participants will find out how they can continue to answer the three questions by becoming involved in statistics education related conferences, newsletters, and groups.

**Become a Catalyst for Change in Statistics Education**, Tuesday, 9:00 a.m.–5:00 p.m., presented by **Joan Garfield**, **Bob delMas**, and **Andy Zieffler**, University of Minnesota, and **Allan Rossman** and **Beth Chance**, California Polytechnic Institute. This one-day workshop will feature materials developed by the NSF-funded CATALYST project (Change Agents for Teaching and Learning Statistics). The changes we are working towards are in both content and pedagogy of the introductory, non-calculus based statistics course. The materials to be shared are designed to help students achieve the learning goals listed in the ASA-endorsed GAISE Report (see [amstat.org](http://amstat.org)). We have developed sets of hands-on activities that form units based around a particular real world problem (e.g., how to develop a SPAM filter for email) and the related statistical ideas that

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emerge from this type of problem. The problems, called “Model Eliciting Activities”, are rich and complex open-ended problems that stimulate statistical thinking, engage students in creating developing and testing unique models to solve the problem, and prepare them to learn the statistical content that follows in the unit. The CATALYST materials focus on important ideas of statistical inference and the use of simulation throughout the course.

This section includes scientific sessions. Several organizations or special groups are having receptions or other social events. Please see the "Social Events" section of this announcement for details.

## Association for Symbolic Logic (ASL)

This two-day program on Friday and Saturday will include sessions of contributed papers as well as Invited Addresses by

**Fernando Ferreira**, Universidade de Lisboa, *Bar-recursive interpretations of classical analysis*, 3:00 p.m. on Friday;

**John Harrison**, Intel Corporation, *Decidability and undecidability in theories of real vector spaces*, 9:00 a.m. on Saturday;

**François Loeser**, Ecole Normale Supérieure CNRS, *Model theory and non-archimedean tame topology, with a view towards Berkovich spaces*, 2:00 p.m. on Saturday;

**Chris Miller**, Ohio State University, *Expansions of o-minimal structures by trajectories of definable vector fields*, 9:00 a.m. on Friday;

**Joseph S. Miller**, University of Wisconsin-Madison, *Randomness and computational strength*, 2:00 p.m. on Friday;

**Slawomir Solecki**, University of Illinois at Urbana-Champaign., *Ramsey theory for finite structures*, 10:00 a.m. on Friday; and

**Stevo Todorcevic**, Université Denis Diderot, Paris VII, and University of Toronto, *Tukey reducibility as a setup of classifying mathematical structures*, 10:00 a.m. on Saturday.

See also these cosponsored events by the ASL: *Surreal Numbers* on Wednesday in the "AMS Special Sessions" listings, and the panel discussion on *Hilbert's Tenth Problem* on Thursday at 10:00 a.m. in the "AMS Other Sessions" section.

## Association for Women in Mathematics (AWM)

**Thirty-first Annual Emmy Noether Lecture**, Thursday, 10:05 a.m., will be given by **Carolyn S. Gordon**, Dartmouth College, on *You can't hear the shape of a manifold*. This lecture series is supported by the U.S. Department of Energy.

Also see the Special Session on *Spectral Problems on Compact Riemannian Manifolds* jointly sponsored by the AWM in the "AMS Special Session" listings.

A luncheon will be given in honor of the lecturer on Thursday; see the "Social Events" section for details.

**Dual Careers or Dueling Careers? Jobs and the Two-Body Problem**, Wednesday, 2:15 p.m.-3:40 p.m. This panel discussion moderated by **Georgia Benkart**, University of Wisconsin-Madison, includes panelists **Christine Min Wotipka**, Stanford University; **Ellen Spertus**, Mills College and Google, **David C. Manderscheid**, University of Nebraska-Lincoln; and **Maia Averett**, Mills College. Just before the panel discussion, AWM will recognize the honoree for the Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman. Note that formal prizewinner announcements are made at the Joint Prize Session on Thursday afternoon.

**Business Meeting**, Wednesday, 3:45 p.m.-4:15 p.m.

**Workshop**, Saturday, 8:20 a.m.-4:20 p.m. With funding from the Office of Naval Research and the National Security, AWM will conduct its workshop for women graduate students and women who have received the Ph.D. within the last five years. Twenty women mathematicians are selected in advance of this workshop to present their research; graduate students will present posters, and recent Ph.D.s will give 20-minute talks. At 1:00 p.m. there is a panel discussion on *Career opportunities: The early years*, moderated by **Rachelle C. DeCoste**, Wheaton College, with panelists **Ann Almgren**, Lawrence Berkeley National Lab, **Maura B. Mast**, University of Massachusetts-Boston, **Sharon M. Frechette**, College of the Holy Cross, and **Ulrica Y. Wilson**, Morehouse College. All mathematicians (female and male) are invited to attend the entire program. Departments are encouraged to help graduate students and recent Ph.D.s who do not receive funding to obtain some institutional support to attend the workshop and other meeting sessions. Updated information about the workshop is available at [www.awm-math.org/workshops.html](http://www.awm-math.org/workshops.html). AWM seeks volunteers to lead discussion groups and act as mentors for workshop participants. If you are interested, please contact the AWM office; inquiries regarding future workshops may be made to the office at [awm@awm-math.edu](mailto:awm@awm-math.edu).

**Reception**, Wednesday, 9:30 p.m.-11:00 p.m. See the listing in the "Social Events" section of this announcement.



## Activities of Other Organizations

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### National Association of Mathematicians (NAM)

Granville-Brown-Haynes Session of Presentations by Recent Doctoral Recipients in the Mathematical Sciences, Friday, 1:00 p.m.–3:30 p.m.

**Cox-Talbot Address**, will be given Friday after the banquet by **Abdulalim A. Shabazz**, Grambling University, *The number zero: Its origin and use*.

**Panel Discussion**, Saturday, 9:00 a.m.–9:50 a.m.

**Business Meeting**, Saturday, 10:00 a.m.–10:50 a.m.

**Claytor-Woodard Lecture** Saturday, 1:00 p.m., **Abdul-Aziz Yakubu**, Howard University, *The impact of periodic proportional harvesting policies on TAC-regulated fishery systems*.

See details about the banquet on Friday in the “Social Events” section.

### National Science Foundation (NSF)

The NSF will be represented at a booth in the exhibit area. NSF staff members will be available to provide counsel and information on NSF programs of interest to mathematicians. The booth is open the same days and hours as the exhibits. Times that staff will be available will be posted at the booth.

### Pi Mu Epsilon (PME)

**Council Meeting**, Friday, 8:00 a.m.–11:00 a.m.

### Rocky Mountain Mathematics Consortium (RMMC)

**Board of Directors Meeting**, Friday, 2:15 p.m.–4:10 p.m.

### Society for Industrial and Applied Mathematics (SIAM)

This program consists of an Invited Address at 11:10 a.m. on Thursday by **Brenda Dietrich**, IBM, *Optimization Inside: The use of mathematical methods in business processes*, and a series of Minisymposia scheduled Wednesday through Saturday:

**Economics and Sustainability**, organized by **Christian Traeger**, University of California, Berkeley, Wednesday morning;

**Frontiers in Geomathematics**, organized by **Willi Freeden**, University of Kaiserslautern; **M. Zuhair Nashed**, University of Central Florida; and **Thomas Sonar**, Technical University of Braunschweig, Wednesday afternoon;

**High School Outreach to Introduce Students to Applied Mathematics**, organized by **Peter Turner**, Clarkson University, Thursday morning;

**Mathematics and a Smart Planet**, organized by **Brenda Dietrich**, IBM, Thursday afternoon;

**Graph Theory**, organized by **Andre Kundgen**, California State University San Marcos, and **Hal Kierstead**, Arizona State University, Friday morning and afternoon  
**New Trends in Mathematical Biology**, organized by **Mariel Vazquez** and **Javier Arsuaga**, San Francisco State University, Saturday morning:

**New Trends in Mathematical Methods in Imaging Science**, organized by **Rick Chartrand**, Los Alamos National Laboratory; **Stacey E. Levine**, Duquesne University; **Jennifer L. Mueller**, Colorado State University, and **Luminita A. Vese**, University of California Los Angeles, Saturday afternoon.

### Young Mathematicians Network (YMN)

**Open Forum**, Thursday, 7:30 p.m.–8:30 p.m., organized by **Sarah Ann Stewart**, Belmont University, and **Joshua D. Laison**, Willamette University. All meeting attendees, including undergraduates and graduate students, are invited to discuss topics and issues affecting young mathematicians.

Also see details about other sessions cosponsored by the YMN under these headings: *MAA Panels, Posters, and Other Sessions Promotion and Tenure...* Friday at 9:00 a.m.; *Project NExT-YMN Poster Session*, Wednesday at 2:15 p.m.; *How to Interview...*, Wednesday at 3:50 p.m.; and *MAA Sessions for Students Graduate School: Choosing One...* Monday at 2:15 p.m.; *Finding a Research Topic...*, Thursday at 1:00 p.m.).

### Others

**Mathematical Art Exhibition**, organized by **Robert Fathauer**, Tessellations Company, **Nathaniel A. Friedman**, ISAMA and SUNY Albany, and **Anne Burns**, Long Island University, C. W. Post University. A popular feature at the last Joint Mathematics Meetings, this exhibition provides a break in your day. On display are works in various media by artists who are inspired by mathematics and by mathematicians who use visual art to express their findings. Fractals, symmetry, and tiling are some of the ideas at play here. Don’t miss this unique opportunity for a different perspective on mathematics. The exhibition will be open during the regular exhibit hours.

**Summer Program for Women in Mathematics (SPWM) Reunion**, Thursday 1:00 p.m.–4:00 p.m., organized by **Murli M. Gupta**, George Washington University. SPWM participants will describe their experiences from past programs.

# Presenters of Papers

*San Francisco, California; January 13–16, 2010*

*Numbers following the name indicate the speaker's position on the program.*

\**Special Session Speaker*, ■*NAM Invited Lecturer*, ▲*SIAM Invited Lecturer*,  
 •*AMS Invited Lecturer*, ◦*MAA Invited Lecturer*, △*Joint Invited Lecturer*,  
 ◇*ASL Invited Lecturer*, ✕*AMS Retiring Presidential Address*, □*AWM Emmy Noether Lecturer*, ▶*Graduate Student*, ▲*Undergraduate Student*

Abayomi, K. A. ....	1408	▶ Almohalwas, A. M. ....	1467	* Awerbuch-Friedlander, T. E. ....	209
Aboufadel, E. ....	842	Alperin, R. C. ....	975	► Awtry, C. ....	555
* Abrams, G. ....	445	◀ Alpert, H. ....	83	Axenovich, M. ....	1402
* Ackerberg-Hastings, A. ....	1676	► AlQudah, M. A. ....	1017	► Axvig, N. ....	1807
Ackerman, N. ....	1960	Alraqad, T. A. ....	1809	Azarian, M. K. ....	80
◀ Ackermann, C. T. ....	1544	* Altshuller, D. ....	695	* Babbitt, D. ....	1681
* Ackleh, A. S. ....	942	Alvarado, A. ....	546	Babichev, A. ....	1287
* Acosta-Humánez, P. ....	1192	An, J.-H. ....	1832	Baeth, N. ....	772
*▶ Adams, H. ....	1483	Anabtawi, J. M. ....	754	Baginski, P. ....	1950
Addington, S. L. ....	364	* Anastassiou, G. A. ....	1215	* Bahls, P. ....	259
Addington, S. L. ....	1891	* Andrews, G. E. ....	950	▶ Bahmanian, M. A. ....	1818
▶ Adhikari, D. ....	746	* Angeloni, L. ....	1113	*▶ Bai, X. ....	1741
Adhikari, D. R. ....	1311	Anglin, S. M. ....	104	Bailey, B. ....	140
* Adler, J. D. ....	1724	Annaby, M. H. ....	1099	Bailey, B. ....	808
*▶ Adrian, M. ....	1726	* Annaby, M. H. ....	1112	▶ Bajracharya, N. ....	1062
Affane-Aji, C. ....	541	*▶ Antieau, B. ....	1194	◀ Baker, M. D. ....	983
* Afriat, A. ....	1516	Aouina, M. B. ....	1786	* Bal, G. ....	231
* Agashe, A. ....	709	* Ara, P. ....	446	Balaji, S. ....	294
Agbegha, G. ....	858	* Aranda Pino, G. ....	669	* Ball, J. A. ....	448
Agbegha, G. ....	1119	Archey, D. ....	1026	◀ Bantle, J. ....	1548
Ahlgren, A. ....	834	* Archibald, T. ....	1678	* Bao, G. ....	41
Ahmed, N. ....	1020	* Ardila, F. ....	250	* Baragar, A. ....	964
Ahmed, N. U. ....	1216	Arganbright, D. E. ....	1914	* Bard, G. V. ....	53
▶ Ahrendt, C. ....	1005	*▶ Armond, C. ....	216	Barg, M. C. ....	1829
Akin-Bohner, E. ....	1246	* Armstrong, S. N. ....	660	* Bargagliotti, A. E. ....	472
Akman, F. ....	126	Arroway, P. ....	1261	* Barker, A. T. ....	17
*▶ Al-Rawashdeh, W. K. ....	697	Arunachalam, V. ....	511	Barker, W. ....	712
Alberts, K. ....	156	Arunakirinathar, K. ....	1531	▶ Barnard, R. C. ....	1828
Alberts, K. ....	794	Asera, R. ....	1524	* Barnard, R. W. ....	687
Aldous, D. ....	6	Ash, J. M. ....	1644	* Barnes, J. A. ....	684
* Aldroubi, A. ....	454	Ashton, B. A. ....	1860	Barrett, L. K. ....	380
* Aldroubi, A. ....	1510	Aslaksen, H. ....	1334	* Barrow-Green, J. ....	1151
Alewine, A. ....	1569	Aslan, B. ....	1251	Barry, M. J. ....	288
* Alford, J. G. ....	943	Assaf, S. H. ....	948	Bartolini, L. ....	113
Ali, J. ....	752	Athanassov, Z. S. ....	1238	*▶ Baskin, D. R. ....	49
Ali, R. M. ....	105	Athavale, P. ....	1934	* Bass, H. ....	1193
* Aljadeff, E. ....	1720	* Atreas, N. D. ....	1114	Bastian, N. D. ....	558
Allali, M. ....	331	▶ Attarian, A. ....	1827	* Basu, S. ....	203
*◀ Allen, B. ....	1137	Attele, K. R. ....	1845	* Bateman, M. ....	36
Allen, R. F. ....	1310	* Avalos, G. ....	934	* Bates, D. J. ....	1484
▶ Allocata, M. P. ....	537	* Avni, N. ....	1716	* Baum, P. F. ....	1487



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* Baum, P. F.	1496	Boersma, S.	793	Callon, G. D.	598
► Bayazit, D.	569	Boersma, S.	1075	Calvert, W.	1445
Bayless, J. W.	1554	* Bona, M.	1764	* Calvetti, D.	190
Beaugris, L.	1885	► Bond, W. O.	798	Campbell Hetrick, B. M.	839
Beaver, S.	1634	* Bonini, V.	232	* Can, M.	949
► Beck, K. A.	778	Bookman, J.	593	* Candes, E.	1217
Beckham, J. R.	1240	Booth, D.	1923	Caniglia, J. C.	1893
Beecher, A. I.	1616	* Booty, M.	917	► Canner, J. E.	516
* Beery, J. L.	1475	* Borodin, A.	1767	*► Capaldi, A.	1702
Beezer, R. A.	1379	► Bosko, L. R.	1424	► Capaldi, M. B.	572
Behrens, C. E.	1366	* Boston, N.	462	* Caparrini, S.	1680
Beier, J. C.	1421	Bouchat, R. R.	776	Carasso, A. S.	402
Beisiegel, M.	860	Bouldin, L.	1881	Cardetti, F.	145
Belcastro, S.-M.	1814	► Bourla, A.	1785	Cardetti, F.	1619
* Bellhouse, D. R.	1675	Bouthellier, P. R.	1568	Cardwell, A. E.	1022
► Ben-Gal, N.	1282	Bouthellier, P. R.	1585	* Carin, L.	465
* Bendel, C. P.	1489	Boutin, D.	1087	* Carlson, J. F.	1492
* Benedetto, J. J.	1513	► Bowling, S. A.	1903	* Carlsson, G. E.	1481
* Benedetto, R. L.	74	*► Bowser, M.	1143	Carlsson, G. E.	1596
* Benedetto, R. L.	868	Bozeman, S. T.	384	* Carrell, J.	1718
* Benito, P.	677	Bradley, R. E.	11	Carter, J. A.	801
Bennett, A. G.	1230	* Brams, S. J.	693	Carter, N.	873
Bennett, A. G.	1525	Brandt, J.	1907	Carter, N.	1920
Bennett, C. D.	1440	Braunstein, J. L.	1348	* Casazza, P. G.	1514
*► Bennett, J. C.	1471	* Bremner, M. R.	676	Case, J.	1347
Bennett, T. L.	1593	Bridge, L.	368	Case, J. O.	1082
Benson, S.	826	* Brilleslyper, M. A.	685	*► Case, J. P.	1339
► Berchenko-Kogan, Y. I.	550	Brin, L.	138	► Castillo-Garsow, C. W.	1908
Berezovskaya, F.	1245	Brin, L.	613	► Castro, A. L.	1035
Berezovskaya, F.	1286	Brodhead, P. S.	314	*► Castro, A. L.	1760
► Berg, D. E.	591	*► Brooks, J. E.	1672	*► Celikbas, O.	1167
Berg, J. D.	837	Brown, C.	500	► Cerini, C.	1057
*► Berg, J. S.	1802	Brown, D. A.	353	Cerreto, F. A.	339
* Berger, H. A.	486	Brown, E.	328	Cerreto, F. A.	800
* Bergeron, F.	945	*► Brown, M.	766	Cervone, D. P.	1380
Berghold, T. A.	360	Brown, S. A.	1390	► Cesmelioglu, A.	764
*► Berkesc, C.	1169	Brown, T. M.	1266	Chakraborty, S.	94
Bernard, K. J.	584	* Brubaker, B.	954	Chakraborty, S.	1586
Berndt, B. C.	638	* Bryant, R. L.	1518	Chakraborty, S.	1884
Berriozábal, M. P.	379	► Buck, J. M.	1321	* Chamberlain, E.	1168
Berrut, J.-P.	1295	► Buck, N. C.	1876	Chamberland, M.	907
* Bertozi, A.	1460	Bucki, A.	1776	* Champanerkar, A.	217
Bertozi, A.	1933	Buckmire, R.	621	*► Chandee, V.	956
► Besse, I. M.	990	► Buczynska, W. J.	1660	Chang, J.-M.	1857
► Bhandari, M. B.	1326	Buechner, J.	1370	Chartier, T.	1898
o Bhargava, M.	411	► Buehrle, C. E.	276	Chartrand, R.	1926
Bhatnagar, S. C.	1354	* Buium, A.	1719	Chau, P. Q.	1397
Bhatta, D.	524	*► Bulanhagui, R. D.	1093	Chavey, D.	604
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## Navigating Between the Program and the Abstracts

### How to find the session when you know the name of the presenter:

Starting from the **Presenters of Papers** listing near the front of the program book, look up the presenter by surname and note the position number to the right of the name. Turning to the **Program of the Sessions**, locate the talk by its position number, which is in parentheses beneath the time of each talk. If you wish to look at the abstract of the talk, follow the instructions below for locating an abstract.

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### How to find the abstract when you know the name of the session:

#### *Special Session on Ergodic Theory and Dynamical Systems. II*

2:30 PM - 4:20 PM		Room 406, Olsen Hall
		Organizers: Stanley J. Eigen, Northeastern University Vidhu S. Prasad, University of Massachusetts, Lowell
2:30PM	(56)	(Non)Invariant Measures for Quasicontinuous Maps. Preliminary report. Annalisa Crannell*, Franklin & Marshall, and Marc Frantz, IUPUI (952-37-11)
3:00PM	(57)	Exactness and Maximal Automorphic Factors of Unimodal Interval Maps. Preliminary report. Henk Bruin, California Institute of Technology, and Jane M. Hawkins*, University of North Carolina at Chapel Hill (952-37-13)
3:30PM	(58)	On Nonsingular Chacon Transformations. Toshihiro Hamachi, Kyushu University, and Cesar E. Silva*, Williams College (952-37-87)
4:00PM	(59)	Conjugacies between ergodic transformations and their inverses. Geoffrey Goodson, Towson University (952-37-36)

Starting from the talk in which you are interested in the **Program of the Sessions**, locate the abstract number, listed in parentheses after the title and author(s). The digits between the two hyphens indicate the Mathematical Subject Classification, or, in the case of a letter and a number, the MAA session code. In the **Abstracts** book, find the relevant Mathematical Subject Classification (MSC) heading or MAA session heading. The headings are listed in numerical order by MSC or alphabetical order by MAA session code. Then within the classification, locate the abstract by its sequence number, the digits after the second hyphen in the abstract number.

indicates presenter  
abstract sequence number  
MSC or session code  
position number

### How to find the presenter's name if you are starting from the abstract:

Starting from the abstract of the talk in the **Papers Presented at Meetings**, locate the name of the presenter, indicated by an asterisk\*. (If there is more than one author, please note that the presenter is not necessarily the first author listed.) Then follow the instructions above for locating a talk by its presenter.

## 37 ► *Dynamical Systems and Ergodic Theory*

952-37-13

Henk Bruin, Mathematics Department 253-37, California Institute of Technology, Pasadena, CA 91125, and Jane M. Hawkins\* ([jmh@math.unc.edu](mailto:jmh@math.unc.edu)), Mathematics Department CB #3250, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599. *Exactness and maximal automorphic factors of unimodal interval maps.* Preliminary report.

We study exactness and maximal automorphic factors of  $C^3$  unimodal maps of the interval. We show that for a large class of infinitely renormalizable maps, the maximal automorphic factor is an odometer with an ergodic nonsingular measure. We give conditions under which maps with absorbing Cantor sets have an irrational rotation on a circle as a maximal automorphic factor, as well as giving exact examples of this type. We also prove that every  $C^3$  S-unimodal map with no attractor is exact with respect to Lebesgue measure. (Received December 13, 1999)

MSC or session code      abstract sequence number      indicates presenter

# Program of the Sessions

*San Francisco, California, January 13-16, 2010*

## Monday, January 11

### ***MAA Short Course on Exploring the Great Books of Mathematics, Part I***

9:00 AM - 4:30 PM	Room 2002, 2nd Floor, Moscone
	Organizers: <b>Amy Shell-Gellasch</b> , Beloit College
	<b>Glen Van Brummelen</b> , Quest University
8:00AM	Registration (outside Room 2002, Moscone).
9:00AM (1)	<i>Ptolemy's Almagest: Greek mathematics and the heavenly bodies.</i> <b>Alex Jones</b> , New York University
1:30PM (2)	<i>Newton's Principia.</i> <b>George Smith</b> , Tufts University

### ***AMS Tutorial on Modeling, Part I: Introduction to Numerical Modeling***

9:00 AM - 4:30 PM	Room 2006, 2nd Floor, Moscone
	Presenter: <b>Chi-Wang Shu</b> , Brown University
8:00AM	Registration (outside Room 2002, Moscone).

The **time limit** for each AMS contributed paper in the sessions is ten minutes. The time limit for each MAA contributed paper varies. In the Special Sessions the time limit varies from session to session and within sessions. To maintain the schedule, time limits will be strictly enforced.

For papers with more than one author, an asterisk follows the name of the author who plans to present the paper at the meeting.

Papers flagged with a solid triangle (►) have been designated by the author as being of possible interest to undergraduate students.

Abstracts of papers presented in the sessions at this

### ***AMS Short Course on Markov Chains and Mixing Times, Part I***

9:30 AM - 5:00 PM	Room 2004, 2nd Floor, Moscone
	Organizers: <b>David A. Levin</b> , University of Oregon
	<b>Yuval Peres</b> , University of California, Berkeley and Microsoft
	<b>Elizabeth L. Wilmer</b> , Oberlin College
8:00AM	Registration (outside Room 2002, Moscone).
9:30AM (3)	<i>Simulation and Markov Chain Monte Carlo.</i> <b>Elizabeth Wilmer*</b> , Oberlin College, and <b>Yuval Peres*</b> , University of California, Berkeley
10:30AM	Break
11:00AM (4)	<i>Coupling and Variations.</i> <b>David Levin</b> , University of Oregon
NOON	Problem Session
2:00PM	Problem Session: Solutions
2:30PM (5)	<i>Shuffling and Strong Stationary Times.</i> <b>Elizabeth Wilmer</b> , Oberlin College
3:30PM	Break
4:00PM (6)	<i>Mixing Times and Hitting Times.</i> <b>David Aldous</b> , University of California Berkeley

meeting will be found in Volume 31, 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 chronologically in the *Abstracts*. The last one to four digits, e.g., 897-20-1136, refer to the receipt number of the abstract; abstracts are further sorted by the receipt number within each classification. MAA abstracts are listed toward the back of the issue sorted by session name.



## **Program of the Sessions – Tuesday, January 12**

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# **Tuesday, January 12**

### **AMS Department Chairs Workshop**

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**8:00 AM – 6:00 PM** Room 2007,  
2nd Floor, Moscone

Organizers: **Lawrence F. Gray**,  
University of Minnesota  
**Stephen B. Robinson**, Wake  
Forest University

### **MAA Ancillary Workshop on Statistics: Teaching Introductory Statistics**

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**8:30 AM – 5:00 PM** Pacific I, Marriott San Francisco

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

### **MAA Ancillary Workshop on Statistics: Become a Catalyst for Change in Statistics Education**

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**8:30 AM – 5:00 PM** Pacific J, Marriott San Francisco

Presenters: **Joan Garfield**, University of  
Minnesota  
**Bob delMas**, University of  
Minnesota  
**Andy Zieffler**, University of  
Minnesota  
**Allan Rossman**, California  
Polytechnic Institute  
**Beth Chance**, California  
Polytechnic Institute

### **AMS Short Course on Markov Chains and Mixing Times, Part II**

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**9:00 AM – 4:30 PM** Room 2004,  
2nd Floor, Moscone

Organizers: **David A. Levin**, University of  
Oregon  
**Yuval Peres**, University of  
California, Berkeley and  
Microsoft  
**Elizabeth L. Wilmer**, Oberlin  
College

- 9:00AM *Lower Bounds.*  
(7) **Elizabet Wilmer**, Oberlin College  
10:00AM Break  
10:30AM *The Cut-off Phenomenon and the Ising  
Model.*  
(8) **Yuval Peres**, University of California  
Berkeley  
11:30AM *Markov chain mixing—examples and  
applications.*  
(9) **Alistair Sinclair**, University of California  
Berkeley

- 2:00PM *Dynamics for the Ising Model, and Its  
Mixing Time.*  
(10) **David Levin\***, University of Oregon, and  
**Yuval Peres\***, University of California,  
Berkeley  
3:00PM Break  
3:30PM Panel Discussion: Open Problems

### **MAA Short Course on Exploring the Great Books of Mathematics, Part II**

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**9:00 AM – 5:00 PM** Room 2002,  
2nd Floor, Moscone

Organizers: **Amy Shell-Gellasch**, Beloit  
College  
**Glen Van Brummelen**,  
Quest University

- 9:00AM *Cauchy and the Cours d'analyse.*  
(11) **Robert E. Bradley\***, Adelphi University,  
and **Ed Sandifer**, Western Connecticut  
State College  
1:15PM *How algebra became modern.*  
(12) **Fernando Q. Gouv  a**, Colby College  
4:20PM *Tracking the great writings of  
mathematics.*  
(13) **Ivor Grattan-Guinness**, Middlesex  
University Business School

### **AMS Tutorial on Modeling, Part II: Introduction to Statistical Modeling**

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**9:00 AM – 4:30 PM** Room 2006,  
2nd Floor, Moscone

Presenter: **Wei Zhu**, State University of  
New York, Stony Brook

### **MAA Board of Governors**

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**9:00 AM – 5:00 PM** Room 3014,  
3rd Floor, Moscone

### **AMS Council**

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**1:30 PM – 10:00 PM** Room 3016,  
3rd Floor, Moscone

### **Joint Meetings Registration**

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**3:00 PM – 7:00 PM** First Floor Lobby, Moscone

### **MAA New Committee Chairs Workshop**

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**7:00 PM – 9:00 PM** Pacific H, Marriott  
San Francisco

Organizers: **Barbara T. Faires**,  
Westminster College  
**Martha J. Siegel**, Towson  
University

# Wednesday, January 13

## *Joint Meetings Registration*

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7:30 AM – 6:00 PM      First Floor Lobby, Moscone

## *AMS-SIAM Special Session on Mathematics of Computation, I*

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8:00 AM – 10:50 AM      Room 2004,  
                                  2nd Floor, Moscone

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

- 8:00AM (14) *A Coarsening Algorithm on Adaptive Grids by Newest Vertex Bisection and its Applications.*  
**Chensong Zhang\***, PA, and **Long Chen**, CA (1056-65-1959)
- 8:30AM (15) *Convergence of Adaptive Finite Element Methods for Nonlinear Partial Differential Equations.* Preliminary report.  
**Michael Holst**, Gantumur Tsogtgerel and **Yunrong Zhu\***, University of California San Diego (1056-65-2033)
- 9:00AM ► (16) *Coordinate Descent for L1 Optimization.* Preliminary report.  
**Yingying Li\*** and **Stanley Osher**, University of California, Los Angeles (1056-49-345)
- 9:30AM (17) *Parallel computation with the weakly over-penalized symmetric interior penalty method.*  
**Andrew T. Barker\*** and **Susanne C. Brenner**, Louisiana State University (1056-65-1193)
- 10:00AM ► (18) *Approximation of kernel matrices with multilevel circulant matrices.*  
**Guohui Song\***, Illinois Institute of Technology, and **Yuesheng Xu**, Syracuse University (1056-65-454)
- 10:30AM (19) *Very fast methods and preconditioners for banded matrices and PDEs on irregular domains.*  
**Martin Gander**, Sébastien Loisel, Université de Genève, and **Daniel B Szyld\***, Temple University (1056-65-1445)

## *AMS-ASL Special Session on Surreal Numbers, I*

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8:00 AM – 10:40 AM      Room 3011,  
                                  3rd Floor, Moscone

Organizers: **Lou van den Dries**, University of Illinois  
**Philip Ehrlich**, Ohio University

- 8:00AM (20) *Surreal Numbers, Conway Names, and the Simplicity Hierarchy.*  
**Philip Ehrlich**, Ohio University (1056-03-262)

- 9:00AM (21) *Surreal numbers and real analysis.*  
**Ovidiu Costin**, The Ohio State University (1056-03-1098)

- 10:00AM (22) *Recent work on H-fields.*  
**Lou van den Dries**, University of Illinois-Urbana/Champaign (1056-03-987)

## *AMS Special Session on Degenerate and Singular Elliptic Partial Differential Equations, I*

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8:00 AM – 10:50 AM      Room 3016,  
                                  3rd Floor, Moscone

Organizers: **Marian Bocea**, North Dakota State University  
**Cristina Popovici**, North Dakota State University

- 8:00AM (23) *Multiple solutions for superlinear p-Laplacian Neumann problems.*  
**Vasile Staicu**, University of Aveiro, Portugal (1056-35-2120)
- 8:30AM (24)  *$\Gamma$ -convergence of power-law functionals with variable exponents.*  
**Marian Bocea**, NDSU (1056-35-1108)
- 9:00AM (25) *Statistics of  $p$ -harmonic functions.* Preliminary report.  
**Matthew Rudd**, University of Idaho (1056-35-1492)
- 9:30AM (26) *Multiple and sign-changing solutions for nonlinear elliptic problems with  $p$ -Laplacian.*  
**Dumitru Motreanu**, University of Perpignan, France (1056-35-878)
- 10:00AM (27) *Subelliptic regularity in non-nilpotent cases.*  
**Andras Domokos**, California State University at Sacramento (1056-35-661)
- 10:30AM ► (28) *Near cloaking defeats the anti-cloak.*  
**Daniel T. Onofrei**, University Of Utah (1056-35-1438)

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

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8:00 AM – 10:50 AM      Room 3003,  
                                  3rd Floor, Moscone

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

- 8:00AM ► (29) *Open Problems and Conjectures in Difference Equations.* Preliminary report.  
**Gerasimos E Ladas**, University of Rhode Island (1056-39-320)
- 8:30AM (30) *Applications of number theory to asymptotic behavior of solutions of difference equations.*  
**Richard T Guy\***, **Kenneth S Berenhaut** and **Katherine M Donadio**, Wake Forest University (1056-39-1865)
- 9:00AM ► (31) *Global convergence of max-type equations.*  
**Timothy Sauer**, George Mason University (1056-39-232)

## Program of the Sessions – Wednesday, January 13 (cont'd.)

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- 9:30AM ► (32) *The Z-transform of queuing systems.*  
Preliminary report.  
**Mostafa Ghandehari\*** and **Shahrzad Sheibani**, University of Texas at Arlington (1056-39-34)
- 10:00AM (33) *Boundary Data Smoothness for Solutions of Nonlocal Boundary Value Problems for nth Order Difference Equations.*  
Preliminary report.  
**Jeffrey W Lyons**, Baylor University (1056-39-28)
- 10:30AM ► (34) *On The Global Behavior Of A System Of Rational Difference Equations.*  
Preliminary report.  
**E. A. Grove**, University of Rhode Island, **Y. Kostov\***, Xavier University of Louisiana, **M. Radin**, Rochester Institute of Technology, and **S. Schultz**, Providence College (1056-39-1290)

### AMS Special Session on Harmonic Analysis (Mathematics Research Communities session), I

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- 8:00 AM – 10:50 AM Room 2006,  
2nd Floor, Moscone
- Organizers: **Kabe Moen**, Washington University  
**Richard Oberlin**, University of California Los Angeles  
**Betsy Stovall**, University of California Los Angeles
- 8:00AM (35) *On an interesting singular integral operator.* Preliminary report.  
**Camil Muscalu**, Cornell University (1056-42-1207)
- 8:30AM (36) *Maximal averages along one-variable vector fields.*  
**Michael Bateman**, UCLA (1056-42-1455)
- 9:00AM (37) *Bilinear Hilbert transforms along curves.*  
**Xiaochun Li**, University of Illinois at Urbana-Champaign (1056-42-1632)
- 9:30AM (38) *A nonlinear stationary phase method for oscillatory Riemann-Hilbert problems.*  
Preliminary report.  
**Q. Yen Do**, UCLA (1056-42-1360)
- 10:00AM (39) *Weak Convergence in multiparameter Hardy spaces.*  
**Jill Pipher**, Brown University (1056-42-280)
- 10:30AM (40) *An index formula in connection with meromorphic approximation.* Preliminary report.  
**Alberto A. Condori**, Rose-Hulman Institute of Technology (1056-42-1657)

### AMS Special Session on Inverse Problems: Analysis and Computations (Mathematics Research Communities session), I

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8:00 AM – 10:50 AM Room 2008,  
2nd Floor, Moscone

Organizers: **Gaik Ambartsumian**, University of Texas at Arlington  
**Raluca Felea**, Rochester Institute of Technology  
**Hongyu Liu**, University of Washington  
**Kui Ren**, University of Texas at Austin  
**Michael VanValkenburgh**, University of California Berkeley

- 8:00AM (41) *Inverse Source Problems for Electromagnetics.* Preliminary report.  
**Gang Bao\***, **Junshan Lin**, Michigan State University, and **Faouzi Triki**, University of Fourier, France (1056-35-1238)
- 8:30AM (42) *Active exterior cloaking.*  
**Daniel T Onofrei**, University Of Utah (1056-35-1487)
- 9:00AM (43) *Diffraction at corners for the wave equation on differential forms.*  
**Andras Vasy**, Stanford University (1056-35-798)
- 9:30AM (44) *Interior Transmission Eigenvalue Problem and its Application in Inverse Scattering Theory.*  
**Fioralba Cakoni**, University of Delaware (1056-35-256)
- 10:00AM (45) *Local Singularity Reconstruction from Integrals over Curves in  $\mathbb{R}^3$  and electron microscopy.* Preliminary report.  
**Eric Todd Quinto\***, Tufts University, and **Hans Rullgard**, University of Stockholm (1056-92-491)
- 10:30AM ► (46) *Ultrasound modulated electrical impedance and optical tomography.*  
Preliminary report.  
**Peter Kuchment\***, Texas A&M University, **Leonid Kunyansky**, University of Arizona, **Moritz Allmaras** and **Wolfgang Bangerth**, Texas A&M University (1056-35-1024)

### AMS Special Session on the Mathematical Challenges of Relativity (Mathematics Research Communities session), I

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8:00 AM – 10:50 AM Room 2000,  
2nd Floor, Moscone

Organizers: **Paul T. Allen**, Lewis & Clark College  
**Michael Eichmair**, M.I.T. and Monash University  
**Gustav Holzegel**, Princeton University

***Wednesday, January 13 – Program of the Sessions***

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8:00AM (47)	Jared Speck, Princeton University Willie W. Wong, University of Cambridge <i>Decay Rate for the Linear Wave Equation on a Schwarzschild Black Hole.</i> Jonathan Luk, Princeton University (1056-35-1449)
8:30AM (48)	Strichartz estimates for Kerr backgrounds. Mihai H Tohaneanu, Purdue University (1056-83-1296)
9:00AM (49)	Strichartz estimates on asymptotically de Sitter spaces. Dean R. Baskin, Stanford University (1056-35-1071)
9:30AM (50)	Breakdown Criteria for Nonvacuum Einstein Equations. Arick Shao, Princeton University (1056-83-921)
10:00AM (51)	Control of local null geometry by rough CMC initial data. Qian Wang, SUNY Stony Brook (1056-83-1910)
10:30AM (52)	Shock Waves in General Relativity. Moritz Andreas Reintjes, University of California in Davis (1056-83-633)

***AMS Special Session on Algebraic Aspects of Cryptology, I***

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8:00 AM – 10:50 AM		Room 3009, 3rd Floor, Moscone
Organizers: Jintai Ding, University of Cincinnati Chris Christensen, Northern Kentucky		
8:00AM ► (53)	Algebraic Attacks on Bivium and Trivium, Accelerated by Cutting the Variable-Sharing Graph. Gregory V. Bard, Fordham University (1056-12-1496)	
8:30AM (54)	The Effect of Projection on the Symmetry of the SFLASH Attack. Daniel C. Smith, Indiana University (1056-12-942)	
9:00AM ► (55)	Multivariate Public Key Cryptography. Bo-Yin Yang, Academia Sinica (1056-13-1203)	
10:00AM (56)	Multivariate Public Key Cryptosystems from Diophantine Equations. Raymond A. Heindl, Clemson University (1056-14-982)	
10:30AM (57)	Square Encryption Schemes: New Directions in Multivariate Public-Key Cryptography. Crystal Lee Clough, Nanyang Technological University, Singapore (1056-12-493)	

***AMS Special Session on Markov Chains and Their Statistical Applications (Mathematics Research Communities session), I***

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8:00 AM – 10:50 AM	Room 2010, 2nd Floor, Moscone
	Organizers: James Flegal, University of California Riverside Radu Herbei, Ohio State University Jessica Zuniga, Stanford University
8:00AM (58)	Markov Chains, Generalized Wishart distributions and Applications to High Dimensional Statistical Inference. Bala Rajaratnam, Stanford University (1056-60-1253)
9:00AM (59)	Improved mixing time bounds for the Thorp shuffle. Preliminary report. Ben J Morris, UC Davis (1056-60-1395)
10:00AM (60)	Applicability of drift and minorization condition for finding rate of convergence of finite state space Markov chains. Partha Sarathi Dey, UC Berkeley (1056-60-1836)
10:30AM (61)	Using Reversible Markov Chains for Distributional Approximation. Preliminary report. Nathan F. Ross, University of California, Berkeley (1056-60-1408)

***AMS Special Session on Zonotopal Algebra and Its Applications, I***

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8:00 AM – 10:40 AM	Room 3005, 3rd Floor, Moscone
	Organizers: Olga Holtz, University of California Berkeley and Technical University Berlin Amos Ron, University of Wisconsin
8:00AM (62)	Geometry of the Restricted Boltzmann Machine. Maria Angelica Cueto, UC Berkeley, Jason Morton, Stanford University, and Bernd Sturmfels*, UC Berkeley (1056-62-423)
9:00AM (63)	Piecewise polynomials and equivariant Chow cohomology of nonsimplicial toric varieties. Preliminary report. Hal Schenck, University of Illinois (1056-14-1166)
10:00AM (64)	Spectral Properties of the Transition Operators Associated with Box Splines. Preliminary report. Rong-Qing Jia, University of Alberta (1056-41-1114)

## Program of the Sessions – Wednesday, January 13 (cont'd.)

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### AMS Special Session on Applications of Graph Theory, I

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8:00 AM – 10:50 AM	Room 3007, 3rd Floor, Moscone
	Organizers: <b>Richard Low</b> , San Jose State University <b>Ralucca M. Gera</b> , Naval Postgraduate School
8:00AM ► (65)	<i>The Link Graph: a Tool for Word Sense Disambiguation.</i> <b>Ralucca M. Gera*</b> , Naval Postgraduate School, <b>Henry Escudero</b> , Juniata College, <b>Pranav Anand</b> , Linguistics Department, University of California Santa Cruz, and <b>Craig Martell</b> , Computer Science Department, Naval Postgraduate School (1056-05-226)
8:30AM ► (66)	<i>A Generalization of Kundu's k-Factor Theorem.</i> Preliminary report. <b>Arthur H. Busch</b> , University of Dayton, <b>Michael J. Ferrara</b> , University of Colorado Denver, <b>Stephen G. Hartke*</b> , University of Nebraska-Lincoln, <b>Michael S. Jacobson</b> , University of Colorado Denver, <b>Hemanshu Kaul</b> , Illinois Institute of Technology, and <b>Douglas B. West</b> , University of Illinois (1056-05-344)
9:00AM ► (67)	<i>Graph invariants from self-assembling nanostructures.</i> <b>Joanna Anthony Ellis-Monaghan*</b> and <b>Greta Pangborn</b> , Saint Michael's College (1056-05-287)
9:30AM (68)	<i>On k-circuit distance in graphs.</i> <b>Ralucca Gera</b> , Naval Postgraduate School, <b>Grady Bullington</b> , <b>Linda Eroh*</b> and <b>Steven J Winters</b> , University of Wisconsin Oshkosh (1056-05-1731)
10:00AM ► (69)	<i>Coding Sequences and Their Applications.</i> Preliminary report. <b>Eunjeong Yi</b> , Texas A&M University at Galveston (1056-05-1075)
10:30AM ► (70)	<i>Bonding Tree Models of RNA Structures.</i> Preliminary report. <b>Teresa Haynes</b> , <b>Debra Knisley</b> and <b>Denise Koessler*</b> , East Tennessee State University (1056-05-2014)

### AMS Special Session on Arithmetic and Nonarchimedean Dynamics, I

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8:00 AM – 10:50 AM	Room 2012, 2nd Floor, Moscone
	Organizers: <b>Joseph Silverman</b> , Brown University <b>Michelle Manes</b> , University of Hawaii <b>Raphael Jones</b> , College of the Holy Cross

8:00AM (71)	<i>Discriminants and Galois groups for iterated rational functions.</i> Preliminary report. <b>Rafe Jones*</b> , College of the Holy Cross, and <b>Michelle Manes</b> , University of Hawaii-Manoa (1056-11-1117)
8:30AM (72)	<i>The dynamical Manin-Mumford problem.</i> <b>Thomas J Tucker*</b> , University of Rochester, <b>Dragos Ghica</b> , University of Lethbridge, and <b>Shouwu Zhang</b> , Columbia University (1056-11-563)
9:00AM (73)	<i>The dynamical Manin-Mumford problem.</i> <b>Dragos Ghica</b> , University of Lethbridge (1056-11-292)
9:30AM (74)	<i>Towards Dynamical Uniform Boundedness for Rational Functions.</i> Preliminary report. <b>Robert L. Benedetto</b> , Amherst College (1056-11-658)
10:00AM (75)	<i>Preperiodic points: from algebraic to complex.</i> <b>Laura DeMarco*</b> , University of Illinois at Chicago, and <b>Matt Baker</b> , Georgia Institute of Technology (1056-37-1206)
10:30AM (76)	<i>Critical Points of Non-Archimedean Dynamical Systems on the Projective Line.</i> Preliminary report. <b>Xander Faber</b> , McGill University (1056-11-664)

### AMS Session on Group Theory, I

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8:00 AM – 10:55 AM	Room 3020, 3rd Floor, Moscone
8:00AM (77)	<i>Subgroups of <math>S_{n+1}</math> normalized by and coprime to a regular subgroup of order <math>n</math>.</i> Preliminary report. <b>Stephen M. Gagola, Jr.</b> , Kent State University (1056-20-122)
8:15AM (78)	<i>The nilpotent product and the nonabelian tensor square of groups.</i> Preliminary report. <b>Arturo Magidin</b> , University of Louisiana at Lafayette (1056-20-272)
8:30AM (79)	<i>Finite Groups with Permutable Supplemented Subgroups.</i> Preliminary report. <b>Joseph Kirtland</b> , Marist College (1056-20-277)
8:45AM (80)	<i>Open Questions and Conjectures Regarding Near Frattini Subgroups of Generalized Free Products of Groups.</i> Preliminary report. <b>Mohammad K. Azarian</b> , University of Evansville (1056-20-371)
9:00AM (81)	<i>A relationship between the property <math>R_\infty</math> and the geometric invariants <math>\Omega^n</math>.</i> <b>Nic Koban*</b> , University of Maine Farmington, and <b>Peter Wong</b> , Bates College (1056-20-474)
9:15AM	Break

**Wednesday, January 13 – Program of the Sessions**

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<p>9:30AM (82) <i>The Probability that Two Semigroup Elements Commute Can Be Anything.</i> <b>Vadim Ponomarenko*</b> and <b>Natalie Selinski</b>, San Diego State University (1056-20-497)</p> <p>9:45AM (83) <i>Finite Phase Transitions in Countable Abelian Groups.</i> <b>Hannah Alpert</b>, University of Chicago (1056-20-499)</p> <p>10:00AM (84) <i><math>L_\delta</math>-equivalence of <math>p</math>-local abelian groups with nice decomposition bases.</i> <b>Ruediger Goebel</b>, <b>Katrin Leistner</b>, University of Duisburg-Essen, Germany, <b>Peter Loth*</b>, Sacred Heart University, and <b>Lutz Struengmann</b>, University of Duisburg-Essen, Germany (1056-20-503)</p> <p>10:15AM (85) <i>An interpretation of the LLT algorithm.</i> <b>Alexander Kleshchev</b> and <b>David Nash*</b>, University of Oregon (1056-20-579)</p> <p>10:30AM (86) <i>Simply intersecting pairs in the mapping class group.</i> <b>Leah Childers</b>, Louisiana State University (1056-20-645)</p> <p>10:45AM (87) <i>Zariski closures of linear differential algebraic groups.</i> <b>Andrei Minchenko*</b>, Cornell University, and <b>Alexey Ovchinnikov</b>, City University of New York (1056-22-1028)</p>	<p>9:30AM (93) <i>Lanchester SDEs and the probability of the target destruction — a stochastic model of terrorism risk.</i> Preliminary report. <b>Michael Powers</b>, Temple University, Department of Risk Management and Insurance, <b>Wei-Shi Yang</b> and <b>Sheng Xiong*</b>, Temple University (1056-60-549)</p> <p>9:45AM (94) <i>Completely Simple Semigroups of Real <math>d \times d</math> Matrices and Recurrent Random Walks.</i> <b>Santanu Chakraborty</b>, University of Texas - Pan American, Edinburg, Texas (1056-60-581)</p> <p>10:00AM (95) <i>A Stochastic Approximation Algorithm for Option Pricing Model Calibration with a Switchable Market.</i> <b>George Yin</b>, Wayne State University, <b>Jie Yu*</b>, Roosevelt University, and <b>Qing Zhang</b>, University of Georgia, Athens (1056-60-590)</p> <p>10:15AM (96) <i>Quantile Hedging for Guaranteed Minimum Death Benefits.</i> Preliminary report. <b>Yumin Wang</b>, Wayne State University (1056-60-670)</p> <p>10:30AM (97) <i>On Sojourn Times in the Finite Capacity M/M/1 Queue with Processor Sharing.</i> <b>Qiang Zhen*</b> and <b>Charles Knessl</b>, University of Illinois at Chicago (1056-60-758)</p>
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**AMS Session on Probability and Statistics, I**

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8:00 AM – 10:40 AM		Room 3010, 3rd Floor, Moscone
8:00AM (88)	<i>MCMC methods for spatial random permutations.</i> Preliminary report. <b>John R Kerl</b> , University of Arizona (1056-60-38)	
8:15AM (89)	<i>Extracting multiscale information from time series characterizing nanoscale systems.</i> <b>Christopher P Calderon</b> , Lawrence Berkeley National Lab (1056-60-91)	
8:30AM (90)	<i>Abstract Measure-Dependent Stochastic Evolution Equations in a Hilbert Space with Applications to Nonlinear Diffusion.</i> Preliminary report. <b>Mark A McKibben</b> , Goucher College (1056-60-135)	
8:45AM (91)	<i>Self-dual planar hypergraphs and exact bond percolation thresholds.</i> Preliminary report. <b>John C. Wierman</b> , Johns Hopkins University (1056-60-452)	
9:00AM (92)	<i>Characterizing departure count moments from queueing nodes fed by nonstationary, non-Poisson arrival processes.</i> <b>Ira Gerhardt*</b> , Manhattan College, and <b>Barry L. Nelson</b> , Northwestern University (1056-60-471)	
9:15AM	Break	

**AMS Session on Mathematics in the Social Sciences**

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8:00 AM – 9:40 AM		Room 2007, 2nd Floor, Moscone
8:00AM ► (98)	<i>Continuous Time Model of Bifurcations and Related Phenomena in Agent-Based Models.</i> <b>Andrew Clark</b> , Thomson Reuters (1056-91-251)	
8:15AM ► (99)	<i>Addiction and Treatment in a rational framework - can lowering health care costs have adverse effects?</i> Preliminary report. <b>Tamas Forgacs*</b> , California State University, Fresno, <b>Attila Cseh</b> , Valdosta State University, and <b>Adnan Sabuwala</b> , California State University, Fresno (1056-91-909)	
8:30AM ► (100)	<i>Dynamical Analysis in Lucas Framework with Heterogeneous Agents.</i> Preliminary report. <b>Yuanying Guan</b> , Florida State University (1056-91-1129)	
8:45AM	Break.	
9:00AM ► (101)	<i>Two player envy-free multi-cake division using a polytopal Sperner's lemma.</i> <b>John Cloutier</b> , University of California at Santa Barbara, <b>Kathryn L. Nyman*</b> , Willamette University, and <b>Francis Edward Su</b> , Harvey Mudd College (1056-91-1642)	

## Program of the Sessions – Wednesday, January 13 (cont'd.)

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- 9:15AM (102) *Option pricing for biomedical firms with predictable price jumps.* Preliminary report.  
**Jin-Chuan Duan**, Risk Management Institute, National University of Singapore, **Anirban Dutta\*** and **Qiji J. Zhu**, Western Michigan University (1056-91-1983)
- 9:30AM ► (103) *Statistical Modeling of Gang Violence in Los Angeles.*  
**Kym C Louie\***, Harvey Mudd College, **Mike Egesdal, Jeremy Neuman**, University of California, Los Angeles, and **Chris Fathauer**, Harvey Mudd College (1056-91-1923)

### AMS Session on Complex Analysis

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- 8:00 AM – 9:55 AM Room 3022,  
3rd Floor, Moscone
- 8:00AM ► (104) *Strong and Weak LFCDS: Local Fractional Complex Derivatives.* Preliminary report.  
**Steve M. Anglin**, Case Western Reserve University (fmr), Mountain View, CA (1056-30-23)
- 8:15AM (105) *On Janowski starlike functions.*  
**Rosihan M. Ali**, Universiti Sains Malaysia (1056-30-175)
- 8:30AM (106) *Subclasses of Meromorphic Functions Associated with Convolution.*  
**See Keong Lee**, Universiti Sains Malaysia (1056-30-514)
- 8:45AM (107)  *$L^p$  Rational Approximation in the Complex Plane.* Preliminary report.  
**Erin R Militzer**, University of Kentucky (1056-30-601)
- 9:00AM (108) *On minimal Rolle's domains for complex polynomials.*  
**Michael J Miller**, Le Moyne College (1056-30-957)
- 9:15AM (109) *Poisson Equation with the Robin/Third Boundary Condition.*  
**Alip Alifu, Maimaiti Mohammed**, York University (1056-30-2128)
- 9:30AM (110) *Mean Value Theorem for Functions on the Complex Plane.* Preliminary report.  
**Nasser Dastrange**, Buena Vista University (1056-26-1044)
- 9:45AM (111) *A residual radial limit zero set.*  
**Michael C Fulkerson**, University of Central Oklahoma (1056-32-1285)

### AMS Session on Geometry and Topology, I

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- 8:00 AM – 10:10 AM Room 3012,  
3rd Floor, Moscone
- 8:00AM (112) *The writhe of oriented polygonal graphs.*  
**Christian Laing\***, Courant Institute of Mathematical Sciences, NYU, and **De Witt Sumners**, Florida State University (1056-54-131)

- 8:15AM (113) *One-sided Heegaard splittings of 3-manifolds.*  
**Loretta Bartolini**, Oklahoma State University (1056-57-1255)
- 8:30AM (114) *Defining Khovanov Homology in 3-Manifolds Using a Diagramless Theory.*  
**Adam C. McDougall**, The University of Iowa (1056-54-1055)
- 8:45AM (115) *Unstable Vassiliev Theory.*  
**Chad D Giusti**, University of Oregon (1056-55-611)
- 9:00AM (116) *Identifying the Canonical Component for the Whitehead Link.* Preliminary report.  
**Emily R Landes**, University of Texas, Austin (1056-54-2096)
- 9:15AM (117) *The Kauffman bracket skein module of  $T^3$ .*  
**Jeffrey Boerner**, University of Iowa (1056-57-1944)
- 9:30AM (118) *The Moduli space of singular Euclidean structures on a sphere with 4 cone points whose cone angles are integer multiples of  $\frac{2\pi}{3}$  but less than  $2\pi$ .* Preliminary report.  
**Aldo-Hilario Cruz-Cota**, Grand Valley State University (1056-54-1389)
- 9:45AM (119) *Lagrangian representations of the  $(p, q, r)$ -triangle group.* Preliminary report.  
**Paul W Lewis**, University of Tennessee, Knoxville (1056-51-284)
- 10:00AM ► (120) *Relationships between Bundle Forms in Laguerre Planes.*  
**Robert D. Knight**, Ohio University-Chillicothe (1056-51-574)

### AMS Session on Discrete Mathematics, I

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- 8:00 AM – 10:55 AM Room 3018,  
3rd Floor, Moscone
- 8:00AM ► (121) *Combinatorial Proofs of Certain Identities.*  
**Akulu Tefera\***, Grand Valley State University, **Aklilu Zeleke**, Michigan State University, and **George Grossman**, Central Michigan University (1056-05-912)
- 8:15AM ► (122) *Playing with Paths: An Introduction to Bijective Combinatorics.*  
**Paul W.T. Fijn**, University of Melbourne, Australia (1056-05-1424)
- 8:30AM ► (123) *Some Remarks On Self-Avoiding Walks.*  
**Shanzhen Gao**, Florida Atlantic University (1056-05-690)
- 8:45AM (124) *On the Non-existence of (160, 54, 18) Difference Sets.*  
**Adegoke S Osifodunrin\***, Georgia Southern University, and **Ken. W Smith**, Sam Houston State University (1056-05-1921)
- 9:00AM ► (125) *Alternating Permutations and the  $m$ th Descents.*  
**Ae Ja Yee and Kagan Kursungoz\***, The Pennsylvania State University (1056-05-628)

## **Wednesday, January 13 – Program of the Sessions**

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|--------------------|---|--------------------|--|
| 9:15AM             | Break   | 9:15AM             | <i>Foot to the Pedal: Generalizing Euler's work on constant pedal curves to constant pedal surfaces.</i> Preliminary report.   |
| 9:30AM<br>► (126)  | <i>The lattice of finite vector space partitions and its Möbius function.</i><br><b>Fusun Akman*</b> and <b>Papa Amar Sissokho</b> , Illinois State University (1056-06-89)     | 9:30AM<br>► (137)  | <b>Hieu D Nguyen</b> , Rowan University (1056-Z1-653)  |
| 9:45AM<br>► (127)  | <i>Generating functions for box-counting problems.</i><br><b>Benjamin J Young</b> , Centre de Recherches Mathématiques / McGill University (1056-05-1961)                       | 9:30AM<br>► (138)  | <i>Turtles, and Lizards, and Snakes, Oh My!</i> Preliminary report.<br><b>Leon Brin</b> , Southern CT State University (1056-Z1-879)   |
| 10:00AM<br>(128)   | <i>Multi-restrained Stirling numbers.</i><br>Preliminary report.<br><b>Ji Young Choi</b> , Sippensburg University of PA (1056-05-1813)  | 9:45AM<br>(139)    | <i>Adapting the Feynman Path Integral for use in a discrete spacetime.</i><br><b>Douglas B Mathews*</b> , <b>Jake Askeland</b> , <b>Cheuk Wong</b> , <b>Miranda Braselton</b> , <b>David Von Gunten</b> , <b>Jonathan Baptist</b> , <b>Duncan McElfresh</b> and <b>Slobodan Simic</b> , San Jose State University (1056-Z1-1670) |
| 10:15AM<br>(129)   | <i>A map from chains in the noncrossing partition lattice to polygon dissections.</i><br><b>Hillary Einziger</b> , The George Washington University (1056-05-1950)              | 10:00AM<br>(140)   | <i>Path elongation and r-reduced cutting numbers of cycles.</i><br><b>Brad Bailey*</b> and <b>Dianna J. Spence</b> , North Georgia College & State University (1056-Z1-735)  |
| 10:30AM<br>(130)   | <i>Regular completions of lattices.</i><br><b>John Harding</b> and <b>Qin Yang*</b> , New Mexico State University (1056-06-739)   | 10:15AM<br>► (141) | <i>Arcs in the plane.</i><br><b>Joan E Hart*</b> , University of Wisconsin Oshkosh, and <b>Kenneth Kunen</b> , University of Wisconsin – Madison (1056-Z1-52)  |
| 10:45AM<br>► (131) | <i>How much does a Hamiltonian cycle weigh?</i> Preliminary report.<br><b>Hurlee Gonchigdanzan</b> , University of Wisconsin - Stevens Point (1056-51-323)                      | 10:30AM<br>(142)   | <i>On the theory of mixed convex functions.</i><br><b>Emre Tokgoz</b> , University of Oklahoma (1056-Z1-402)   |
| 11:00AM<br>► (132) | <i>Generalized Schröder numbers.</i><br><b>Shojo Tseng*</b> , <b>Jen-Chien Lo</b> , Tamkang University, and <b>Wing-Sum Cheung</b> , The University of Hong Kong (1056-Z1-1516) | 10:45AM<br>► (143) | <i>Some Nonlinear Delay Integral Inequalities On Time Scales.</i> Preliminary report.<br><b>Shiojenn Tseng*</b> , <b>Jen-Chien Lo</b> , Tamkang University, and <b>Wing-Sum Cheung</b> , The University of Hong Kong (1056-Z1-1516)  |

## **MAA Session on General Contributed Papers, I**

**8:00 AM - 10:55 AM**      **Room 3000,  
3rd Floor, Moscone**

Organizers: **Eric S. Marland**,  
Appalachian State University  
**Daniel J. Curtin**, Northern  
Kentucky University

- 8:00AM (132) *Analysis of the secondary Flow effects on an open channel with cross stream variation of the bottom roughness.*  
**Ahmed Kaffel\***, Virginia Tech, Amel Soualmia, LMHE, and Masbernat Lucien, imft (1056-Z1-1423)

8:15AM ► (133) *A Biexponential Model of Electroosmotic Flow.* Preliminary report.  
**Rachel R Roe-Dale\***, Emese Lipcsey-Magyar and Kimberly Frederick, Skidmore College (1056-Z1-1422)

8:30AM ► (134) *Building on Nature's Inspiration: A NAKFI Synthetic Biology Report.* Preliminary report.  
**Jeffrey L Poet**, Missouri Western State University (1056-Z1-1168)

8:45AM ► (135) *Using Neural Networks for Near-Interpolation of Scattered Data.*  
**Laurene V Fausett**, Texas A&M University-Commerce (1056-Z1-260)

9:00AM ► (136) *Chromatic Methods For Creating A Secure Identification Procurement.*  
**Timothy Grant Hall**, PQI Consulting (1056-Z1-418)

***MAA Session on The Scholarship of  
Teaching and Learning in Undergraduate  
Mathematics, I***

**8:00 AM - 10:55 AM**      **Room 2011,  
2nd Floor, Moscone**

Organizers: **Edwin P. Herman**, University of Wisconsin - Stevens Point  
**Nathan M. Wodzak**, University of Wisconsin - Stevens Point

- 8:00AM (144) *Creating Student Centered, Active Learning Classrooms in a Multi-Section Precalculus Course.*  
**Paula A. Shorter\*** and **Mairead K. Greene**, Rockhurst University  
(1056-Q1-2046)

8:20AM ► (145) *Anatomy of a multi-section calculus semester: A students-eye view.*  
Preliminary report.  
**Fabiana Cardetti\*** and **P. Joseph McKenna**, University of Connecticut  
(1056-Q1-1594)

## **Program of the Sessions – Wednesday, January 13 (cont'd.)**

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|---|--|
| <p>8:40AM<br/>► (146)</p> <p><i>Calculus Acquisition through a Problem and Activity Based Learning Experience (CAPABLE).</i> Preliminary report.<br/><b>Gary Fowler, Sommer Gentry*, Amy Ksir and Will Traves</b>, United States Naval Academy (1056-Q1-1773)</p> | <p>9:20AM (157)</p> <p><i>Some More Lab Experiences in Introductory Statistics.</i><br/><b>Patricia B Humphrey</b>, Georgia Southern University (1056-F5-1294)</p>         |
| <p>9:00AM<br/>► (147)</p> <p><i>Peer Led Team Learning in Calculus I: A four year study.</i><br/><b>John C. Merkel</b>, Morehouse College (1056-Q1-2015)</p>  | <p>9:40AM ► (158)</p> <p><i>A Second Course for Non-Majors – Relevance is the Key!</i><br/><b>Murray H Siegel</b>, Arizona State University, Polytechnic (1056-F5-264)</p> |
| <p>9:20AM ► (148)</p> <p><i>Success in Calculus I: Oral Reviews.</i><br/><b>Mary A Nelson*</b>, University of Colorado, Boulder, and <b>Monica R Geist</b>, Front Range Community College (1056-Q1-648)</p>   | <p>10:00AM ► (159)</p> <p><i>Stat2 - What Should We Do?</i> Preliminary report.<br/><b>Robin H Lock</b>, St. Lawrence University (1056-F5-2031)</p>                        |
| <p>9:40AM ► (149)</p> <p><i>Results of the use of guided notes and lab work in introductory college courses.</i><br/><b>Ellen F Hill</b>, Minnesota State University Moorhead (1056-Q1-1052)</p>  | <p>10:20AM (160)</p> <p><i>An Innovative Second Half-Course in Applied Statistics.</i><br/><b>John D McKenzie</b>, Babson College (1056-F5-1904)</p>                       |
| <p>10:00AM ► (150)</p> <p><i>Student-Generated Note Cards: Sound Pedagogy?</i> Preliminary report.<br/><b>Kenneth Horton</b>, U. S. Air Force Academy (1056-Q1-1695)</p>  | <p>10:40AM ► (161)</p> <p><i>A Successful Second Course in Business Statistics.</i> Preliminary report.<br/><b>Sue B Schou</b>, Idaho State University (1056-F5-552)</p>   |
| <h3><u>Employment Center</u></h3>   |  |
| <p>8:00 AM – 7:00 PM<br/>► (151)</p> <p><i>A Modified Moore Method in Real Analysis: Hearing the Students' Voices.</i> Preliminary report.<br/><b>Joy Moore*</b> and <b>Bernd Rossa</b>, Xavier University (1056-Q1-1629)</p>                                     | <p>Exhibit Hall, Moscone</p>   |
| <p>10:40AM (152)</p> <p><i>Teaching Abstract Algebra using Technology.</i> Preliminary report.<br/><b>Claus Schubert*</b> and <b>Mary Gfeller</b>, SUNY Cortland (1056-Q1-342)</p>  | <p><b>SIAM Minisymposium on Economics and Sustainability</b></p>   |
| <p>8:05 AM – 11:00 AM<br/>► (153)</p>   | <p>Room 2002<br/>2nd Floor, Moscone</p>  |

## *MAA Session on Improving a Second Course in Statistics*

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| 8:00 AM - 10:55 AM | Room 2009,<br>2nd Floor, Moscone   |
|                    | Organizers: <b>Nancy J. Boynton</b> , SUNY Fredonia  |
|                    | <b>Patricia B. Humphrey</b> , Georgia Southern University  |
|                    | <b>Michael A. Posner</b> , Villanova University  |
| 8:00AM<br>► (153)  | <i>Teaching Undergraduate Statistics in R.</i><br>Preliminary report.<br><b>Salil Kumar Das</b> , Prince Georges' Community College (1056-F5-1919)                       |
| 8:20AM<br>► (154)  | <i>Interdisciplinary Case Studies for an Intermediate Statistics Course.</i><br><b>Terje Hoim</b> , Wilkes Honors College, Florida Atlantic University (1056-F5-1447)    |
| 8:40AM<br>(155)    | <i>Finding and Working with Real-World Clients in a Second Statistics Course.</i><br><b>Cora Neal</b> , Sonoma State University (1056-F5-437)                            |
| 9:00AM<br>(156)    | <i>Experiential Learning of Non-parametric Statistics through a campus-client led survey project.</i><br><b>K. Scott Alberts</b> , Truman State University (1056-F5-617) |

*Employment Center*

**8:00 AM – 7:00 PM**      **Exhibit Hall, Moscone**

## ***SIAM Minisymposium on Economics and Sustainability***

Organizer: **Christian Traeger**,  
University of California,  
Berkeley

- 8:05AM  
(162) **Preferences Yielding the Precautionary Effect.**  
**Michel De Lara**, Université Paris-Est  
(1056-91-1065)

8:30AM  
► (163) **Mathematical Analysis of Smart Grids Using Randomized Algorithms.**  
**Kourosh Modarresi**, Stanford University  
(1056-90-2067)

8:55AM  
(164) **Exact Calibration of Programming Models of Agricultural Supply against Exogenous Sets of Supply Elasticities.**  
**Pierre R. Merel\*** and **Santiago Bucaram**,  
Agricultural and Resource Economics,  
University of California, Davis  
(1056-90-1181)

9:20AM Break.

9:35AM  
► (165) **Closing the gap between risk estimation and decision-making: efficient management of trade-related invasive species risk.** Preliminary report.  
**Michael R Springborn\***, University of California, Davis, and **Robert Lieli**, University of Texas, Austin  
(1056-91-1274)

10:00AM  
(166) **Time perspective and climate change policy.**  
**Larry S Karp\***, Agricultural and Resource Economics, University of California, Berkeley, and **Yacov Tsur**, Hebrew University (1056-91-1196)

## *Wednesday, January 13 – Program of the Sessions*

- 10:25AM (167) *Risk, Uncertainty and Climate Change Evaluation.* Preliminary report.  
**Christian P Traeger**, UC Berkeley (ARE)  
(1056-91-2030)

10:50AM Final discussion.

## **MAA Session on Mathematical Texts: Famous, Infamous, and Influential, I**

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|---------|--|----------------------------------|
|         |  | Room 2022,<br>2nd Floor, Moscone |
|         | Organizers: <b>Fernando Q. Gouvêa</b> , Colby<br>College<br><b>Amy Shell-Gellasch</b> , Beloit<br>College  |                                  |
| 8:55AM  | Welcome.   |                                  |
| 9:00AM  | Geometry and Algebra in Ancient<br>Civilizations by B. L. van der Waerden: A<br><i>Text Exploring the Origin and<br/>Development of Ancient Mathematics.</i> |                                  |
| ► (168) | <b>Toke L Knudsen</b> , SUNY Oneonta<br>(1056-H1-1420)   |                                  |
| 9:20AM  | <i>The Elements, its evil influence.</i><br>Preliminary report.  |                                  |
| ► (169) | <b>Alejandro R. Garciadiego</b> , Universidad<br>Nacional Autónoma de México (UNAM)<br>(1056-H1-836)   |                                  |
| 9:40AM  | <i>Rip-off or Reverence? Hypsicles of<br/>Alexandria and the fourteenth book of<br/>the Euclid's Elements.</i>   |                                  |
| (170)   | <b>Clemency J Montelle</b> , University of<br>Canterbury (1056-H1-1140)  |                                  |
| 10:00AM | <i>Conjugate Diameters: Apollonius<br/>of Perga and Eutocius of Ascalon.</i><br>Preliminary report.  |                                  |
| ► (171) | <b>Colin Bryan Powell McKinney</b> ,<br>University of Iowa (1056-H1-580)   |                                  |
| 10:20AM | <i>Newton's Principia : What is in it and why<br/>should we care?</i>  |                                  |
| ► (172) | <b>Herbert E Kasube</b> , Bradley University<br>(1056-H1-818)  |                                  |
| 10:40AM | <i>Eric Temple Bell's Men of Mathematics:<br/>From Influential to Infamous.</i>  |                                  |
| ► (173) | <b>V. Frederick Rickey</b> , West Point<br>(1056-H1-1323)  |                                  |

*MAA Minicourse #13: Part A*

- 9:00 AM - 11:00 AM**      **Pacific J, Marriott  
San Francisco**

*Taking symbols seriously: Teaching form  
and function in college algebra.*

Organizers: **William G. McCallum**,  
University of Arizona  
**Deborah Hughes Hallett**,  
University of Arizona and  
Harvard University  
**Pat Shure**, University of  
Michigan

*MAA Minicourse #4: Part A*

- 9:00 AM – 11:00 AM** Pacific H,  
**Marriott San Francisco**

## *Using video-case studies in teaching a proof-based gateway course to the mathematics major.*

Organizers: **James T. Sandefur**,  
Georgetown University  
**Connie M. Campbell**,  
Millsaps College  
**Kay B. Somers**, Moravian  
College

*MAA Minicourse #7: Part A*

- 9:00 AM – 11:00 AM**      **Pacific I, Marriott  
San Francisco**

*Teaching with clickers in the classroom.*  
Organizers: **Derek Bruff**, Vanderbilt  
University  
**Adam Lucas**, Saint Mary's  
College of California

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

- 9:00 AM – 10:35 AM**      **Room 2020,  
2nd Floor, Moscone**

Organizers: **Jacqueline A. Jensen**, Sam Houston State University  
**Deanna B. Haunsperger**, Carlton College  
**Robert W. Vallin**, Slippery Rock University and the MAA

- (174) *The most engaging activity in Mathematics/Computer Science Club.*  
Preliminary report.  
**Ryo Ohashi**, King's College  
(1056-K5-1587)
  - (175) *Lawrence Tech's best Math Club events.*  
**Ruth Favro**, Lawrence Technological University (1056-K5-684)
  - (176) *A Revamped Problem-Solving Competition.* Preliminary report.  
**Pamela A Richardson\*** and **Natacha C Fontes-Merz**, Westminster College  
(1056-K5-639)
  - (177) *Digital Scavenger Hunts.*  
**Tom Thompson**, Walla Walla University  
(1056-K5-455)
  - (178) *Math Extravaganza!*  
**Tracii Friedman**, Mesa State College  
(1056-K5-1627)

*Student Hospitality Center*

- 9:00 AM - 5:00 PM**      **South Lobby,  
2nd Floor, Moscone**

## **Program of the Sessions – Wednesday, January 13 (cont'd.)**

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### **MAA CUPM Subcommittee on Mathematics Across the Disciplines Panel Discussion**

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**9:00 AM – 10:20 AM** Room 3004,  
3rd Floor, Moscone

*Mathematical collaborations with other disciplines: Research partnerships and interdisciplinary programs.*

Organizer: **Joseph Malkevitch**, York College (CUNY)

Panelists: **Steven Brams**, New York University

**Susan L. Ganter**, Clemson University

**James G. Glimm**, SUNY at Stony Brook

**Suzanne M. Lenhart**, University of Tennessee

### **MAA Panel Discussion**

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**9:00 AM – 10:20 AM** Room 3006,  
3rd Floor, Moscone

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

Organizers: **Henry Warchall**, NSF/DMS

**Karen A. Marrongelle**, NSF/DRL

**Dennis E. Davenport**, NSF/DUE

**Daniel P. Maki**, NSF/DUE

**Lee L. Zia**, NSF/DUE

### **MAA Department Liaisons Meeting**

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**9:30 AM – 11:00 AM** Room 3014,  
3rd Floor, Moscone

### **AMS Session on Category Theory**

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**10:00 AM – 10:55 AM** Room 2007,  
2nd Floor, Moscone

(179) *A finiteness property for braided fusion categories.*

**Deepak Naidu\*** and **Eric Rowell**, Texas A&M University (1056-18-316)

(180) *Blocks in Deligne's Rep( $S_t$ ).*

**Jonny Comes**, University of Oregon (1056-18-983)

(181) *Leavitt Algebras and Categories of Modules for Nonunital Rings. Preliminary report.*

**Leandro Marin**, Universidad de Murcia (Spain) (1056-18-1036)

(182) *The First of the Three Homotopy Exact Sequences of a Fibration in Module Theory.*

**C. Joanna Su**, Providence College (1056-18-1937)

### **AMS Invited Address**

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**10:05 AM – 10:55 AM** Main Lecture Room, 2nd Floor, Moscone

(183) *Chaos and symmetry in partially hyperbolic systems.*  
**Amie Wilkinson**, Northwestern University (1056-37-8)

### **AMS Session on Matrices and Tensors**

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**10:15 AM – 10:55 AM** Room 3022, 3rd Floor, Moscone

10:15AM (184) *On Constructibility Results for a Class of Non-Selfadjoint Analytic Perturbations of Matrices with Degenerate Eigenvalues.*  
**Aaron Welters**, UCI (1056-15-1076)

10:30AM (185) *Factorization Strategies for Tensors.*  
**Misha Kilmer**, Tufts University, and **Carla D Martin\***, James Madison University (1056-15-2082)

10:45AM (186) *Spectrally arbitrary patterns of matrices over finite fields.*  
**Elizabeth J. Bodine\*** and **Judith J. McDonald**, Washington State University (1056-15-935)

### **AMS-MAA Invited Address**

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**11:10 AM – NOON** Main Lecture Room, 2nd Floor, Moscone

► (187) *The interpolation problem.*  
**Joseph Harris**, Harvard University (1056-14-41)

### **Exhibits and Book Sales**

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**12:15 PM – 5:30 PM** Exhibit Hall, Moscone

*Come to the Grand Opening at 12:15!*

### **AMS Colloquium Lectures: Lecture I**

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**1:00 PM – 2:00 PM** Main Lecture Room, 2nd Floor, Moscone

(188) *Increasing and decreasing subsequences.*  
**Richard P. Stanley**, M.I.T. (1056-05-16)

### **MAA Invited Address**

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**2:15 PM – 3:05 PM** Main Lecture Room, 2nd Floor, Moscone

(189) *The real computation controversy: Is it real?*  
**Lenore Blum**, Carnegie Mellon University (1056-A0-4)

## *Wednesday, January 13 – Program of the Sessions*

## **AMS-SIAM Special Session on Mathematics of Computation, II**

**2:15 PM - 6:05 PM**      **Room 2004,  
2nd Floor, Moscone**

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

- (190) *Bayesian Scientific Computing.*  
**Daniela Calvetti\*** and **Erkki J. Somersalo**, Case Western Reserve University (1056-65-2138)

► (191) *Global Minimization of Markov Random Fields with Applications to Optical Flow.*  
**Tom Goldstein\***, **Xavier Bresson** and **Stanley Osher**, UCLA (1056-49-1648)

► (192) *Evaluating expectations of functionals of Brownian motions: a multilevel idea.*  
**Ben Niu\***, **Fred Hickernell**, Illinois Institute of Technology, **Thomas Müller-Gronbach**, Universität Passau, and **Klaus Ritter**, Technische Universität Darmstadt (1056-65-453)

► (193) *A Dual Iterative Substructuring Method with a Penalty Term in Three Dimensions.*  
**Eun-Hee Park\***, Louisiana State University, and **Chang-Ock Lee**, KAIST (1056-65-616)

► (194) *A higher order WENO algorithm to solve radiative transfer of photons in the 'early universe'.*  
**Ishani Roy\***, Brown University, **Wen Xu**, University of Arizona, **Jing-Mei Qiu**, Colorado School of Mines, **Chi-Wang Shu**, Brown University, and **Li-Zhi Fang**, University of Arizona (1056-65-691)

► (195) *Simulation of Surfactant Dynamics using Spectral Method.* Preliminary report.  
**Yuen Yick Kwan**, Tulane University (1056-65-1963)

► (196) *The Multiscale Discontinuous Galerkin Method for Solving a Class of Second Order Elliptic Problems with Rough Coefficients.*  
**Wei Wang\***, Center for Turbulence Research, Stanford University, **Johnny Guzmán** and **Chi-Wang Shu**, Brown University (1056-65-1623)

► (197) *Efficient High-Order Methods Using Bandlimited Basis Functions.*  
**Li-Lian Wang**, Nanyang Technological University (1056-65-1507)

## **AMS-ASL Special Session on Surreal Numbers, II**

**2:15 PM - 6:05 PM**      **Room 3011,  
3rd Floor, Moscone**

Organizers: **Lou van den Dries**,  
University of Illinois  
**Philip Ehrlich**, Ohio  
University

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| ► (198)         | <i>Transseries, a survey.</i><br><b>Joris van der Hoeven</b> , CNRS, Ecole Polytechnique, France (1056-06-612)   |
| 3:15PM<br>(199) | <i>The exponential logarithmic power series fields.</i><br><b>Salma Kuhlmann*</b> , Universitaet Konstanz, and <b>Saharon Shelah</b> , Hebrew University (1056-06-1940)                      |
| 4:15PM<br>(200) | <i>Surreal numbers as transseries.</i><br><b>Joris van der Hoeven</b> , University of Paris-Sud, <b>Salma Kuhlmann</b> and <b>Mickael Matusinski*</b> , University of Konstanz (1056-06-594) |
| 5:15PM<br>(201) | <i>Generalized power series and real closed fields, Part I.</i><br><b>Julia Knight</b> and <b>Karen Lange*</b> , University of Notre Dame (1056-03-678)                                      |
| 5:45PM<br>(202) | <i>Generalized power series and real closed fields: Part II.</i><br><b>Julia F. Knight*</b> and <b>Karen Lange</b> , University of Notre Dame (1056-03-649)                                  |

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

**2:15 PM - 6:05 PM**      **Room 3003,  
3rd Floor, Moscone**

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

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|-------------------|---|
| 2:15PM<br>(203)   | <i>Global Behavior of Solutions to a Planar System of First-Order Rational Difference Equations.</i><br><b>Sukanya Basu</b> , Midwestern State University (1056-39-764)   |
| 2:45PM<br>(204)   | <i>Complex Dynamics and Symbolic Dynamics.</i><br><b>Elizabeth D Russell</b> , United States Military Academy (1056-37-1039)  |
| 3:15PM<br>► (205) | <i>Competition Models with Allee effects.</i><br>Preliminary report.<br><b>N Saber Elaydi</b> , Trinity University (1056-39-1017)   |
| 3:45PM<br>(206)   | <i>Stability and complexity of small random systems of stochastic linear difference equations.</i><br><b>Harold M Hastings*</b> , <b>Michael Bantegui</b> , <b>Michael Palmer</b> and <b>Thomas Savino</b> , Hofstra University (1056-39-1070)  |
| 4:15PM<br>► (207) | <i>The Dynamics of the Periodically Forced Sigmoid Beverton-Holt Model, part I.</i><br>Preliminary report.<br><b>April Harry</b> , Xavier University of Louisiana, <b>Candace M Kent</b> , Virginia Commonwealth University, and <b>Vlajko L Kocic*</b> , Xavier University of Louisiana (1056-39-916)  |
| 4:45PM<br>(208)   | <i>The Dynamics of the Periodically Forced Sigmoid Beverton-Holt Model, part II.</i><br>Preliminary report.<br><b>April Harry</b> , Xavier University of Louisiana, <b>Candace M Kent*</b> , Virginia Commonwealth University, and <b>Vlajko L Kocic</b> , Xavier University of Louisiana (1056-39-917) |

## **Program of the Sessions – Wednesday, January 13 (cont'd.)**

- (209) *The Aging Heart and the Loss of Complexity- a Difference Equation Model.*  
Preliminary report.  
**Tamara Eugenia Awerbuch-Friedlander\*** and **Richard Levins**, Harvard School of Public Health (1056-39-2059)
  - (210) *A difference equation model to measure the length of Latency of HSV1 infections in differential cells.*  
**Youssef M Dib\*** and **Mariette Maroun**, University of Louisiana, Monroe (1056-39-1846)

## **AMS Special Session on Geometric Aspects of Link and 3-manifold Invariants, I**

- |                 | Room 3016,<br>3rd Floor, Moscone   |
|-----------------|--|
|                 | Organizers: <b>Oliver Dasbach</b> , Louisiana State University<br><b>Effie Kalfagianni</b> , Michigan State University   |
| 2:15PM<br>(211) | <i>Heegaard genus, cut number, weak <math>p</math>-congruence, and quantum invariants.</i><br><b>Patrick M Gilmer</b> , Louisiana State University (1056-57-619)   |
| 2:45PM<br>(212) | <i>A dimer model for the twisted Alexander polynomial.</i><br><b>Moshe Cohen, Oliver Dasbach</b> and <b>Heather M. Russell*</b> , Louisiana State University (1056-57-1827)  |
| 3:15PM<br>(213) | <i>Graph-based methods establishing nontriviality of state cycle Khovanov homology classes.</i><br><b>Andrew Elliott</b> , Rice University (1056-57-47)  |
| 3:45PM<br>(214) | <i>On Khovanov homology and Heegaard Floer homology.</i><br><b>J. Elisenda Grigsby*</b> , Boston College, and <b>Stephan M. Wehrli</b> , Institut de Mathématiques de Jussieu; Université Paris 7 (1056-51-1342)                                 |
| 4:15PM<br>(215) | <i>Topologically slice knots with non-trivial Alexander polynomial.</i><br><b>Matthew E Hedden*</b> , Michigan State University, <b>Charles Livingston</b> , Indiana University, and <b>Daniel Ruberman</b> , Brandeis University (1056-57-1085) |
| 4:45PM<br>(216) | <i>Walks Along Braids and the Colored Jones Polynomial.</i> Preliminary report.<br><b>Cody Armond</b> , Louisiana State University (1056-57-1329)  |
| 5:15PM<br>(217) | <i>On Jones polynomials of closed braids with a full twist.</i> Preliminary report.<br><b>Abhijit Champanerkar*</b> and <b>Ilya Kofman</b> , College of Staten Island, CUNY (1056-57-1373)   |
| 5:45PM<br>(218) | <i>Ribbon-graph tensor products, relative polynomial invariants and applications to links.</i> Preliminary report.<br><b>Neal W. Stoltzfus*</b> , Louisiana State University, and <b>Brittan Farmer</b> , University of Michigan (1056-57-1436)  |

# **AMS Special Session on Harmonic Analysis (Mathematics Research Communities session), II**

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|-------------------|---|
| 2:15 PM - 5:05 PM | Room 2006,<br>2nd Floor, Moscone  |
|                   | Organizers: <b>Kabe Moen</b> , Washington University  |
|                   | <b>Richard Oberlin</b> , University of California Los Angeles   |
|                   | <b>Betsy Stovall</b> , University of California Los Angeles   |
| 2:15PM<br>(219)   | <i>Regularization for Slightly Super Critical Surface Quasi-geostrophic Equation.</i><br><b>Michael Dabkowski</b> , University of Wisconsin (1056-42-1651)  |
| 2:45PM<br>(220)   | <i>Sobolev space estimates for a class of bilinear pseudodifferential operators unbounded on Lebesgue spaces.</i><br><b>Frederic Bernicot</b> , CNRS & Universite Lille 1, Laboratoire de Mathematiques Paul Painleve, France, and <b>Rodolfo H. Torres*</b> , University of Kansas (1056-42-953) |
| 3:15PM<br>(221)   | <i>Sobolev Inequalities for <math>(0, q)</math> forms on CR manifolds of finite type.</i><br><b>Po Lam Yung</b> , Princeton University (1056-42-291)  |
| 3:45PM<br>(222)   | <i>Multi-linear integrals associated to sparse subsets of <math>\mathbb{R}</math>.</i><br><b>Izabella Laba and Malabika Pramanik*</b> , University of British Columbia, Vancouver (1056-42-1003)  |
| 4:15PM<br>(223)   | <i>Pointwise Divergence of <math>L^1</math> Ergodic Averages Along the Nth Powers.</i><br><b>Patrick R. LaVictoire</b> , UC Berkeley (1056-37-1257)   |
| 4:45PM<br>(224)   | <i>Upper Bounds for Multilinear Sublevel Sets.</i><br><b>Michael Christ</b> , University of California, Berkeley (1056-42-1513)   |

**AMS Special Session on Inverse Problems:  
Analysis and Computations (Mathematics  
Research Communities session), II**

## ***Wednesday, January 13 – Program of the Sessions***

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|--|--|----------------------------------|---|
| 2:15PM<br>(225)  | <i>Reconstruction of the Stefan-Boltzmann coefficients in the heat transfer process.</i><br><b>Jin Cheng*</b> , Fudan University, Shanghai, China, <b>Shuai Lu</b> , Johann Radon Institute for Computational and Applied Mathematics, Austria, and <b>Masahiro Yamamoto</b> , University of Tokyo (1056-35-550) | 2:45PM<br>(233)                  | <i>Global geometry of <math>T^2</math> symmetric spacetimes with weak regularity.</i><br><b>Jacques Smulevici*</b> , Max-Planck-Institute for Gravitational physics, and <b>Philippe G. LeFloch</b> , Laboratoire Jacques-Louis Lions and CNRS (1056-83-1198) |
| 2:45PM<br>(226)  | <i>Imaging from Bistatic and Multiply Scattered Waves.</i><br><b>Clifford J Nolan*</b> and <b>Thomas Dowling</b> , University of Limerick (1056-42-1526)   | 3:15PM<br>(234)                  | <i>On Hamilton's Ricci flow and Bartnik's construction of metrics of prescribed scalar curvature.</i><br><b>Chen-Yun Lin</b> , Columbia University (1056-83-349)  |
| 3:15PM<br>(227)  | <i>Inverse transport theory and optical tomography for media with varying index of refraction.</i><br><b>Stephen McDowall</b> , Western Washington University (1056-35-902)  | 3:45PM<br>(235)                  | <i>Optimization problems within a harmonic conformal class.</i><br><b>Jeffrey L Jauregui</b> , Duke University (1056-53-366)  |
| 3:45PM<br>(228)  | <i>Inverse Spectral Problems for Analytic Domains in <math>\mathbb{R}^n</math>.</i><br><b>Hamid Hezari*</b> , MIT, and <b>Steve Zelditch</b> , Johns Hopkins University (1056-35-1009)   | 4:15PM<br>(236)                  | <i>A gluing construction regarding point particles in general relativity.</i> Preliminary report.<br><b>Iva Stavrov</b> , Lewis and Clark College (1056-83-694)   |
| 4:15PM<br>(229)  | <i>A Multilevel, Modified Regularized Total Least Norm Approach to Signal Deblurring.</i><br><b>Malena Espanol*</b> , California Institute of Technology, and <b>Misha Kilmer</b> , Tufts University (1056-65-1021)  | 4:45PM<br>(237)                  | <i>A Model Problem for Conformal Parameterizations of the Einstein Constraint Equations.</i><br><b>David Maxwell</b> , University of Alaska Fairbanks (1056-35-663)   |
| <b>AMS Special Session on Algebraic Aspects of Cryptology, II</b>  |  |                                  |   |
| 2:15 PM – 5:35 PM  |  | Room 3009,<br>3rd Floor, Moscone |   |
| Organizers: <b>Jintai Ding</b> , University of Cincinnati<br><b>Chris Christensen</b> , University of Cincinnati |  |                                  |   |

**AMS Special Session on the Mathematical Challenges of Relativity (Mathematics Research Communities session), II**

**2:15 PM - 5:05 PM**      **Room 2000,  
2nd Floor, Moscone**

Organizers: **Paul T. Allen**, Lewis & Clark College  
**Michael Eichmair**, M.I.T.  
and Monash University  
**Gustav Holzegel**, Princeton University  
**Jared Speck**, Princeton University  
**Willie W. Wong**, University of Cambridge

2:15PM (232) *Hypersurfaces in Hyperbolic Poincaré Manifolds and Conformally Invariant PDEs.*  
**Vincent Bonini\***, California Polytechnic State University, **Jie Qing**, University of California, Santa Cruz, and **Jose Espinar**, Universidad de Granada (1056-53-1316)

## **AMS Special Session on Algebraic Aspects of Cryptology, II**

**2:15 PM - 5:35 PM**      **Room 3009,  
3rd Floor, Moscone**

Organizers: **Jintai Ding**, University of Cincinnati  
**Chris Christensen**, Northern Kentucky

- 2:15PM (238) *Solving multivariate polynomial equations over finite fields.* Preliminary report.  
**Ding Jintai**, University of Cincinnati (1056-12-1621)

3:15PM (239) *Growth of the ideal generated by a quadratic Boolean function.* Preliminary report.  
**Jintai Ding, Timothy J Hodges\*** and **Victoria Kruglov**, University of Cincinnati (1056-13-1539)

3:45PM (240) *MutantXL: An Efficient Algorithm for Solving Multivariate Polynomial Equations.*  
**Johannes Buchmann**, TU Darmstadt, **Jintai Ding**, University of Cincinnati, **Mohamed Saied Emam Mohamed\***, **Wael Said Abd Elmageed Mohamed**, TU Darmstadt, and **Daniel Cabarcas**, University of Cincinnati (1056-14-477)

4:15PM (241) *New Algorithm for Computing Grobner bases.*  
**Shuhong Gao\*** and **Yinhua Guan**, Clemson University (1056-13-1705)

4:45PM (242) *Analysis of A Multivariate Internal Perturbation Scheme.*  
**Lei Hu**, Graduate School of Chinese Academy of Sciences (1056-94-1122)

## Program of the Sessions – Wednesday, January 13 (cont'd.)

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- 5:15PM ► (243) *A Signature Scheme over Non-commutative Groups Secure Against Existential Forgery.* Preliminary report.  
**Yesem Kurt-Peker**, Randolph College (1056-94-1566)

- 4:45PM ► (250) *Double Hurwitz numbers as splines.* Preliminary report.  
**Federico Ardila**, San Francisco State University (1056-05-1856)
- 5:15PM (251) *Power Ideals.*  
**Alexander Postnikov\***, MIT, and **Federico Ardila**, SFSU (1056-05-1785)

### AMS Special Session on Markov Chains and Their Statistical Applications (Mathematics Research Communities session), II

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2:15 PM – 4:55 PM

Room 2010,  
2nd Floor, Moscone

Organizers: **James Flegal**, University of California Riverside  
**Radu Herbei**, Ohio State University  
**Jessica Zuniga**, Stanford University

- 2:15PM (244) *Hitting-time Distributions for Markov Chains.* Preliminary report.  
**James Allen Fill**, The Johns Hopkins University (1056-60-1746)
- 3:15PM (245) *Evaluation of Formal posterior distributions via Markov chain arguments.*  
**Galin Jones**, University of Minnesota (1056-62-1158)
- 4:15PM (246) *Finding Sparse Cuts Locally Using Evolving Sets.*  
**Reid Andersen**, Microsoft, and **Yuval Peres\***, Microsoft Research (1056-60-1993)

### AMS Special Session on Zonotopal Algebra and Its Applications, II

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2:15 PM – 5:55 PM

Room 3005,  
3rd Floor, Moscone

Organizers: **Olga Holtz**, University of California Berkeley and Technical University Berlin  
**Amos Ron**, University of Wisconsin

- 2:15PM (247) *Jump formulae for Multiple Bernoulli polynomials and Verlinde sums.* Preliminary report.  
**Michele Vergne**, Paris, France (1056-52-886)
- 3:15PM (248) *Hierarchical zonotopal spaces.*  
**Olga Holtz**, University of California-Berkeley, Technische Universitaet Berlin, Institute for Advanced Study, **Amos Ron\***, University of Wisconsin-Madison, and **Zhiqiang Xu**, Chinese Academy of Sciences (1056-13-1949)
- 4:15PM (249) *Multiparking Functions, Graph Search, and Tutte Polynomial.*  
**Catherine Yan\*** and **Dimitrije Kostic**, Texas A&M University (1056-05-674)

### AMS Special Session on Applications of Graph Theory, II

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2:15 PM – 6:05 PM

Room 3007,  
3rd Floor, Moscone

Organizers: **Richard Low**, San Jose State University  
**Ralucca M. Gera**, Naval Postgraduate School

- 2:15PM (252) *An Effective Upperbound on Treewidth Using Partial Fill-in of Separators.*  
**Martin Charles Golumbic\***, Caesarea Rothschild Institute and Department of Computer Science, University of Haifa, and **Boi Faltings**, Artificial Intelligence Laboratory (LIA), Ecole Polytechnique Fédérale de Lausanne (EPFL) (1056-05-576)
- 2:45PM ► (253) *A new proof of the four-color theorem.*  
**John Paul Steinberger**, Tsinghua University, Beijing (1056-05-253)
- 3:15PM (254) *On Graham's Tree Reconstruction Conjecture.*  
**Bill Kay\*** and **Joshua Cooper**, University of South Carolina (1056-05-326)
- 3:45PM ► (255) *Non-existence of circulant expander family.* Preliminary report.  
**Wasin So**, San Jose State University (1056-05-313)
- 4:15PM ► (256) *Detecting a Machine Failure in a Network: Vertex Identifying Codes.*  
**Daniel W Cranston\***, Virginia Commonwealth University, and **Gexin Yu**, College of William & Mary (1056-05-281)
- 4:45PM (257) *Best Monotone Degree Conditions for the Integrity and Tenacity of Graphs.*  
**Michael Robert Yatauro**, Research Fellow/Stevens Institute of Technology (1056-00-1674)
- 5:15PM (258) *Toughness and Degree Sequence Conditions.* Preliminary report.  
**Nathan Kahl\***, Seton Hall University, **Douglas Bauer**, Stevens Institute of Technology, **Hajo Broersma**, Durham University, **Ed Schmeichel**, San Jose State University, and **Jan van den Heuvel**, London School of Economics (1056-05-760)
- 5:45PM (259) *The L(2,1) channel-assignment problem on trees.* Preliminary report.  
**Patrick Bahls**, University of North Carolina, Asheville (1056-05-60)

## Wednesday, January 13 – Program of the Sessions

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### **AMS Special Session on Arithmetic and Nonarchimedean Dynamics, II**

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**2:15 PM – 6:05 PM**

**Room 2012,  
2nd Floor, Moscone**

Organizers: **Joseph Silverman**, Brown University

**Michelle Manes**, University of Hawaii

**Raphael Jones**, College of the Holy Cross

**2:15PM (260)** *Multipliers of periodic cycles for cubic polynomials.*

**Patrick Ingram**, University of Waterloo (1056-37-669)

**2:45PM (261)** *Local and global canonical height functions for affine space regular automorphisms.*

**Shu Kawaguchi**, Osaka University (1056-11-973)

**3:15PM (262)** *Rationality of the Space of Morphisms on  $\mathbb{P}^1$ .*

**Alon Levy**, Columbia University (1056-37-565)

**3:45PM (263)** *Torsion points of higher order in the Nottingham group. Preliminary report.*

**Jonathan Lubin**, Brown University (1056-11-361)

**4:15PM (264)** *A Dynamical Pairing Between Two Rational Maps.*

**Clayton Petsche\***, Hunter College, **Lucien Szpiro**, CUNY Graduate Center, and **Thomas J. Tucker**, University of Rochester (1056-11-555)

**4:45PM (265)** *A Local-Global Criterion for Dynamics on  $\mathbb{P}^1$ .*

**Joseph H. Silverman**, Brown University, and **J. Felipe Voloch\***, University of Texas at Austin (1056-11-154)

**5:15PM (266)** *On dynamical zeta functions for polynomial maps over  $p$ -adic fields. Preliminary report.*

**Liang-Chung Hsia**, National Central University, Taiwan (1056-11-568)

**5:45PM ► (267)** *On the Number of Rational Pre-Images Under Quadratic Dynamical Systems.*

**Benjamin Hutz**, Amherst College (1056-11-575)

**2:45PM ► (269)** *Electronic Study Guide – Maplets for Calculus.*

**Philip B Yasskin\***, Texas A&M University, and **Douglas B Meade**, University of South Carolina (1056-BD-1115)

**3:15PM ► (270)** *Successful on-line Math course: myth or reality?*

**Larissa Williamson**, University of Florida (1056-BD-270)

**3:45PM (271)** *Online Delivery and the Use of Technology in the Classroom.*

**Michael Speed\*** and **Simon Sheather**, Texas A&M University College Station (1056-BD-96)

**4:15PM (272)** *Computational Discrete Mathematics: Computation versus Bourbaki.*

**Klaus Sutner**, Computer Science Department, Carnegie Mellon University (1056-BD-1252)

**4:45PM ► (273)** *WeBWorK: Open source on-line homework system for mathematics.*

**Michael E. Gage**, University of Rochester (1056-BD-584)

**5:15PM ► (274)** *Evidence Based Course Design – The Open Learning Initiative at Carnegie Mellon.*

**Candace M Thille**, Carnegie Mellon University (1056-BD-1824)

### **MAA Invited Paper Session on Online Delivery of Mathematics**

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**2:15 PM – 5:35 PM**

**Room 3008,  
3rd Floor, Moscone**

Organizer: **Bernd S. W. Schroeder**, Louisiana Tech University

**2:15PM ► (268)** *On-Line Delivery of Differential Equations: (How) Does It Work?*

**Bernd S. W. Schroeder**, Louisiana Tech University (1056-BD-248)

### **MAA Minicourse #11: Part A**

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**2:15 PM – 4:15 PM Pacific I, Marriott San Francisco**

*The mathematics of Islam and its use in the teaching of mathematics.*

Organizer: **Victor J. Katz**, University of the District of Columbia

### **MAA Minicourse #12: Part A**

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**2:15 PM – 4:15 PM Pacific J, Marriott San Francisco**

*Learning discrete mathematics via historical projects.*

Organizers: **Jerry M. Lodder**, New Mexico State University

**Guram Bezhanishvili**, New Mexico State University

**David Pengelley**, New Mexico State University

### **MAA Minicourse #6: Part A**

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**2:15 PM – 4:15 PM Pacific H, Marriott San Francisco**

*Developing departmental self-studies.*

Organizers: **Donna L. Beers**, Simmons College

**Nancy Baxter Hastings**, Dickinson College

## **Program of the Sessions – Wednesday, January 13 (cont'd.)**

*AMS Session on Group Theory, II*

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| 2:15PM<br>► (275) | <i>Complete Groups: The Automorphism Tower and Some Characterizations.</i><br><b>Elizabeth Wilcox</b> , Binghamton University (1056-20-733)  |
| 2:30PM<br>► (276) | <i>Representations of the Iwahori-Hecke algebra of the symmetric group.</i><br><b>Charles E Buehrle</b> , Lehigh University (1056-20-1061)   |
| 2:45PM<br>► (277) | <i>On the nonabelian tensor product of finite groups of relatively prime order.</i><br>Preliminary report.<br><b>Luise-Charlotte Kappe and Viji Thomas*</b> , Binghamton University (1056-20-1265)   |
| 3:00PM<br>► (278) | <i>On Z-Structures of Groups.</i> Preliminary report.<br><b>Carrie Jean Tirel</b> , University of Wisconsin - Milwaukee (1056-20-1376)   |
| 3:15PM<br>► (279) | <i>Some Coxeter groups of CAT(0) dimension three.</i><br><b>Cody L Patterson</b> , University of Texas at Austin (1056-20-1381)  |
| 3:30PM            | Break.   |
| 3:45PM<br>► (280) | <i>Central Extensions of Divisible Groups.</i><br><b>Jason Elliot</b> , University of Illinois at Urbana-Champaign (1056-20-1461)  |
| 4:00PM<br>► (281) | <i>Stable Commutator Length in Braid Groups.</i> Preliminary report.<br><b>Joel Louwsma</b> , California Institute of Technology (1056-20-1483)  |
| 4:15PM<br>► (282) | <i>Enumerating Nilpotent Loops.</i><br><b>Daniel A Daly*</b> , Southeast Missouri State University, and <b>Petr Vojtěchovský</b> , University of Denver (1056-20-1598)   |
| 4:30PM<br>► (283) | <i>The free metabelian product of a free nilpotent group with a free abelian group.</i><br><b>Margaret H. Dean</b> , Borough of Manhattan Community College of CUNY (1056-20-1655)   |
| 4:45PM<br>► (284) | <i>Localization and extraction of roots in nilpotent R-powered groups.</i> Preliminary report.<br><b>Marcos Zyman*</b> , Borough of Manhattan Community College, CUNY, and <b>Stephen Majewicz</b> , Kingsborough Community College, CUNY (1056-20-1659) |
| 5:00PM            | Break.   |
| 5:15PM<br>► (285) | <i>An introduction to the Bieri-Neumann-Strebel Invariant for finitely generated groups.</i><br><b>Keith Michael Jones</b> , Binghamton University (SUNY) (1056-20-1740)   |
| 5:30PM<br>► (286) | <i>On Some Conjectures Concerning Groups With Perfect Order Subsets.</i> Preliminary report.<br><b>Lenny Jones and Kelly Toppin*</b> , Shippensburg University (1056-20-1782)  |

5:45PM (287) *Computing the Projective Indecomposable Modules of large Finite Groups.*  
**Selin Kalacycioglu**, Kenyon College  
(1056-20-2114)

*AMS Session on Probability and Statistics, II*

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|-------------------|--|
| 2:15PM<br>(288)   | <i>The Density Function of the First Occurrence of a Binary Pattern.</i><br><b>Michael J.J. Barry</b> , Allegheny College<br>(1056-60-785)   |
| 2:30PM<br>(289)   | <i>Central Limit Theorems for Hilbert-space Valued Random Fields Satisfying a Strong Mixing Condition.</i><br><b>Cristina Tone</b> , Indiana University<br>(1056-60-981)   |
| 2:45PM<br>(290)   | <i>A method for finding exact site percolation critical thresholds for a class of lattices.</i> Preliminary report.<br><b>Matthew R.A. Sedlock*</b> and <b>John C. Wierman</b> , Johns Hopkins University<br>(1056-60-1080)  |
| 3:00PM<br>(291)   | <i>On Dynamic Scheduling of a Parallel Server System with Certain Graph Structure.</i> Preliminary report.<br><b>Vladimir Petic*</b> and <b>Ruth Williams</b> , UCSD (1056-60-1367)  |
| 3:15PM<br>(292)   | <i>Asymptotic behavior of the finite-size magnetization as a function of the speed of approach to criticality.</i><br><b>Richard S Ellis</b> , <b>Jonathan Machta</b> , University of Massachusetts, Amherst, and <b>Peter T Otto*</b> , Willamette University<br>(1056-60-1379) |
| 3:30PM            | Break  |
| 3:45PM<br>(293)   | <i>Two related integrals over spaces of continuous functions, revisited.</i> Preliminary report.<br><b>Ian Pierce</b> , University of Nebraska - Lincoln (1056-60-1744)  |
| 4:00PM<br>► (294) | <i>Phases in the Mixing of Gases via the Ehrenfest Urn Model.</i><br><b>Srinivasan Balaji*</b> and <b>Hosam M Mahmoud</b> , George Washington University (1056-60-1920)  |
| 4:15PM<br>(295)   | <i>Further results on statistical significance of ranking paradoxes.</i> Preliminary report.<br><b>Anna E. Bargagliotti</b> , University of Memphis, and <b>Raymond N. Greenwell*</b> , Hofstra University (1056-62-59)  |
| 4:30PM<br>► (296) | <i>Statistical Inference for Computer Models with Multidimensional Output.</i> Preliminary report.<br><b>Dorin Drignei</b> , Oakland University (1056-62-329)  |
| 4:45PM<br>(297)   | <i>The Use of Skew-Normal Distribution for Dose-Response Modeling in Toxicological Experiments.</i><br><b>Mehdi Razzaghi</b> , Bloomsburg University (1056-62-521)   |
| 5:00PM            | Break  |

## *Wednesday, January 13 – Program of the Sessions*

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|-------------------|--|-----------------|--|
| 5:15PM<br>(298)   | <i>Graph ranking on gene network.</i><br><b>Cuilan Gao*, Xin Dang, Yixin Chen and Dawn Wilkins</b> , University of Mississippi (1056-62-711)   | 4:45PM<br>(310) | <i>Fundamental Groups of Solenoid Complements.</i><br><b>Mark H. Meilstrup*</b> , <b>Gregory Conner</b> , Brigham Young University, and <b>Dusan Repovs</b> , University of Ljubljana (1056-57-1652) |
| 5:30PM<br>► (299) | <i>Estimation of the Convolution of Distributions Under Different Censoring Models of Survival Data.</i><br><b>Ke Wu</b> , California State University, Fresno (1056-62-738)         | 5:00PM          | <i>Break</i>   |
| 5:45PM<br>(300)   | <i>Improving an existing estimator of the unknown input function.</i><br><b>Eun-Joo Lee*</b> , Millikin University, and <b>Frits Ruymgaart</b> , Texas Tech University (1056-62-931) | 5:15PM<br>(311) | <i>The Structure of Combinatorial Geodesics in CAT(0) Simplicial 3-Complexes.</i><br><b>Rena MH Levitt</b> , Pomona College (1056-57-1875)   |
| ► (312)           | <i>Shifts on compact metric o-dimensional spaces.</i> Preliminary report.<br><b>Rajagopalan Minakshisundaram</b> , Tennessee State University (1056-54-1264)                         | 5:30PM          | <i>Generalizations to Coarse Geometry.</i> Preliminary report.<br><b>Jared R. Bunn</b> , University of Tennessee (1056-51-275)   |

## *AMS Session on Geometry and Topology, II*

**2:15 PM - 5:55 PM**      **Room 3012,  
3rd Floor, Moscone**

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| 2:15PM<br>► (301) | <i>Another look at Euler's parallel oblique-angled diameters.</i><br><b>Thomas J Osler</b> , Rowan University (1056-51-863)  |
| 2:30PM<br>(302)   | <i>Translation planes admitting a linear Abelian group of order <math>(q+1)^2</math>.</i><br><b>Oscar E Vega*</b> , California State University, Fresno., and <b>Esteban M Diaz</b> , University of Connecticut (1056-51-1119) |
| 2:45PM<br>► (303) | <i>A Characterization Of The Finite Affine Translation Planes Of Odd Order.</i><br>Preliminary report.<br><b>Ricardo Enrique Rojas</b> , Northern State University (1056-51-1305)  |
| 3:00PM<br>(304)   | <i>A proof of the Kauffman-Harary Conjecture.</i><br><b>Thomas W Mattman*</b> , California State University, Chico, and <b>Pablo Solis</b> , UC, Berkeley (1056-57-358)  |
| 3:15PM<br>► (305) | <i>Representations of arrangement groups.</i><br><b>Daniel C. Cohen</b> , Louisiana State University, <b>Michael J. Falk*</b> , Northern Arizona University, and <b>Richard Randell</b> , University of Iowa (1056-57-556)     |
| 3:30PM            | Break  |
| 3:45PM<br>(306)   | <i>Rigidity of Hyperbolic Orbifolds.</i><br><b>Philip C Huling</b> , Saint Louis University (1056-57-615)  |
| 4:00PM<br>(307)   | <i>alpha-Sloped Thin Position for 3-manifolds.</i><br><b>Marion Moore</b> , UC Davis (1056-57-918)   |
| 4:15PM<br>► (308) | <i>A dictionary for defining key concepts in plasma Physics in terms of Clebsch charts in contact geometry.</i> Preliminary report.<br><b>P. Robert Kotiuga</b> , Boston University, ECE Dept. (1056-57-1313)                  |
| 4:30PM<br>► (309) | <i>New twisted dimer model for the twisted Alexander polynomial.</i> Preliminary report.<br><b>Moshe Cohen*</b> , Oliver Dasbach and <b>Heather M. Russell</b> , Louisiana State University (1056-57-1573)                     |

*AMS Session on Discrete Mathematics, II*

**2:15 PM - 5:40 PM**      **Room 3018,  
3rd Floor, Moscone**

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|-------------------|---|
| ▶ (314)           | <i>The Strength of the Grätzer-Schmidt Theorem.</i><br><b>Paul Steven Brodhead</b> *, Virginia State University, and <b>Bjørn Kjos-Hanssen</b> , University of Hawaii at Manoa (1056-06-768)      |
| 2:30PM<br>▶ (315) | <i>Results on the Order Between Orbits in the Conjugacy Decomposition of a Canonical Monoid.</i> Preliminary report.<br><b>Ryan K Therkelsen</b> , North Carolina State University (1056-06-1000) |
| 2:45PM<br>▶ (316) | <i>A gap theorem for the poset of sequential degrees.</i> Preliminary report.<br><b>Benjamin Wells</b> , University of San Francisco (1056-06-1283)   |
| 3:00PM<br>▶ (317) | <i>The Toothpick Sequence and Other Sequences from Cellular Automata.</i> Preliminary report.<br><b>Neil J.A. Sloane</b> , AT&T Shannon Labs (1056-05-230)  |
| 3:15PM<br>▶ (318) | <i>Symmetry and Log-Concavity Results for the Fibmaj Statistic.</i> Preliminary report.<br><b>Kendra Killpatrick</b> , Pepperdine University (1056-05-428)  |
| 3:30PM            | Break   |
| 3:45PM<br>▶ (319) | <i>Lower Bounds for Balanced Simplicial Complexes.</i><br><b>Steven Klee</b> , University of Washington (1056-05-467)   |
| 4:00PM<br>▶ (320) | <i>Packing Degree Sequences.</i> Preliminary report.<br><b>Tyler Seacrest</b> , University of Nebraska - Lincoln (1056-05-506)  |
| 4:15PM<br>▶ (321) | <i>Thin Lehman Matrices and Their Graphs.</i><br><b>Jonathan Wang</b> , Harvard University (1056-05-533)  |
| 4:30PM            | Break   |

## Program of the Sessions – Wednesday, January 13 (cont'd.)

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- 4:45PM (322) *Extremal 2-supereulerian graphs.* Preliminary report. **Hong-Jian Lai**, West Virginia University, and **Huiya Yan\***, University of Wisconsin-La Crosse (1056-05-536)
- 5:00PM (323) *The optimal  $t$ -rubbling number of the complete  $m$ -ary tree.* Preliminary report. **Lisa Danz**, Massachusetts Institute of Technology (1056-05-586)
- 5:15PM ► (324) *Simultaneous and non-simultaneous Bulgarian Exchange.* Preliminary report. **Suzanne I Doree**, Augsburg College, Minneapolis (1056-05-651)
- 5:30PM (325) *Supereulerian Graphs and Hamiltonian Line Graphs.* **Yanting Liang**, West Virginia University (1056-05-731)
- 4:30PM ► (335) *An Action Research Proposal: Does the Ability to Purchase a Week's Worth of Groceries for under One Dollar Influence the Chance that a Student will make an "Innumeracy Type" Statistical Error?* Preliminary report. **Larry Wayne Lewis**, Spalding University (1056-Z1-1605)
- 4:45PM (336) *Using Proofs without Words to Explore Rules of Differentiation.* **Tom McMillan** and **Jim Fulmer\***, University of Arkansas at Little Rock (1056-Z1-1601)
- 5:00PM ► (337) *The Blip of the Blop: A Successful Mathematics Major Seminar.* Preliminary report. **Gerald M. Higdon**, Fitchburg State College (1056-Z1-1311)
- 5:15PM ► (338) *Statistics-Based Calculus?* **Patti Frazer Lock**, St. Lawrence University (1056-Z1-1241)
- 5:30PM ► (339) *Mathematics across the Curriculum: A Twenty-year Retrospective.* **Frank Anthony Cerreto**, The Richard Stockton College of NJ (1056-Z1-1309)
- 5:45PM ► (340) *Visualizing and Utilizing the Symmetry Method for Differential Equations.* **S. L. Yap**, California State University East Bay (1056-Z1-1443)

### MAA Session on General Contributed Papers, II

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2:15 PM – 5:55 PM Room 3000,  
3rd Floor, Moscone

Organizers: **Eric S. Marland**, Appalachian State University  
**Daniel J. Curtin**, Northern Kentucky University

- 2:15PM (326) *Huppert's Conjecture and  $\mathrm{PSp}_4(q)$ .* **Thomas Philip Wakefield**, Youngstown State University (1056-Z1-336)
- 2:30PM ► (327) *Lobb's Generalization of Catalan's Parenthesization Problem and Forder's Catalan Triangle.* **Thomas Koshy**, Framingham State College (1056-Z1-974)
- 2:45PM ► (328) *Why is  $PSL(2, 7) \cong GL(3, 2)$ ?* **Ezra Brown\*** and **Nicholas A. Loehr**, Virginia Tech (1056-Z1-379)
- 3:00PM ► (329) *The Harmonic Series and Biconvergence: One step forward, two steps back.* **Christopher M Davis**, George Mason University, and **David G Taylor\***, Roanoke College (1056-Z1-387)
- 3:15PM ► (330) *Polynomial Root Motion.* **Christopher S Frayer**, University of Wisconsin-Platteville (1056-Z1-636)
- 3:30PM ► (331) *Mathematics in Signal Processing.* **Mohamed Allali**, Chapman University (1056-Z1-646)
- 3:45PM ► (332) *A Two-Course Sequence on Mathematical Programming for Undergraduates.* **Paul E. Fishback**, Grand Valley State University (1056-Z1-604)
- 4:00PM ► (333) *Bridging Policy and Practice Through Ethnomathematics in the Pacific.* **Linda Furuto**, University of Hawai'i (1056-Z1-39)
- 4:15PM ► (334) *Just-in-Time Calculus.* Preliminary report. **Katherine S. Kelm**, California State University, Fresno (1056-Z1-1805)

### MAA Session on Developmental Mathematics Education: Helping Under-Prepared Students Transition to College-Level Mathematics, I

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2:15 PM – 4:10 PM Room 2024,  
2nd Floor, Moscone

Organizers: **Kimberly J. Presser**, Shippensburg University  
**J. Winston Crawley**, Shippensburg University

- 2:15PM (341) *College Mathematical Readiness of the Senior High School Students of the Public Schools in District 1 of Davao City, Philippines.* **Melanie Joyno Orig**, University of Mindanao, Davao City, Philippines (1056-D1-223)
- 2:35PM (342) *Developmental Mathematics and Assessment: Where have we come from? Where are we now? Where are we going?* Preliminary report. **Kimberly J Presser**, Shippensburg University (1056-D1-809)
- 2:55PM ► (343) *"Rock Math" a Successful Implementation of a Curriculum Designed to Help Under-prepared Students make the Transition to College Mathematics.* **Robert E Burks\*** and **Eric W. Drake**, United States Military Academy (1056-D1-233)

## ***Wednesday, January 13 – Program of the Sessions***

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|---|--|
| <p>3:15PM<br/>► (344) <i>Online Interdisciplinary Mathematics: Project MESH.</i><br/><b>Suzanne Galayda*</b> and <b>Kathleen Berver</b>, New Mexico State University (1056-D1-1413)</p> <p>3:35PM<br/>► (345) <i>Beginning Behind: The Effect of Background Knowledge and Mathematical Self Image on University Precalculus Students' Success.</i><br/><b>Christine L. Ebert</b>, <b>Donna A. Mark*</b> and <b>Rachael M. Todd</b>, University of Delaware (1056-D1-881)</p> <p>3:55PM<br/>► (346) <i>Understanding and addressing the social/emotional needs of learners with histories of difficulty in mathematics.</i><br/><b>Michael H Davis</b>, UC Berkeley Lawrence Hall of Science (1056-D1-794)</p>   | <p>3:35PM<br/>► (351) <i>Integrating Civic Engagement in an Integral Calculus Course.</i> Preliminary report.<br/><b>Barbara P. Gonzalez-Arevalo*</b> and <b>Melanie Pivarski</b>, Roosevelt University (1056-E5-480)</p> <p>3:55PM<br/>► (352) <i>Undergraduate Research as Resource.</i> Preliminary report.<br/><b>Michael E McDaniel</b>, Aquinas College (1056-E5-266)</p> <p>4:15PM<br/>► (353) <i>From Inquiry to Research - Fostering Research with Undergraduates.</i><br/><b>David A. Brown</b>, Ithaca College (1056-E5-211)</p> <p>4:35PM<br/>► (354) <i>An undergraduate original research experience: Mathematical modeling with graph theory.</i><br/><b>Faun C. C. Doherty</b>, Washington and Jefferson College (1056-E5-97)</p> <p>4:55PM<br/>► (355) <i>"Introduction to Being a Math Major" seminar.</i><br/><b>Michael Dorff</b>, Brigham Young University (1056-E5-1200)</p> <p>5:15PM<br/>► (356) <i>Bio-Math Connection in Undergraduate Mathematics.</i> Preliminary report.<br/><b>Urmila Ghosh-Dastidar</b>, New York City College of Technology, CUNY (1056-E5-2016)</p> <p>5:35PM<br/>► (357) <i>Expanding Opportunities in Mathematics across the Curriculum.</i><br/><b>Joyati Debnath</b>, Winona State University, Winona, MN (1056-E5-763)</p> |
| <b>AA Session on Experiences that Enrich the Education of Mathematics Majors, I</b>   |  |
| 15 PM – 5:50 PM   | Room 2020,<br>2nd Floor, Moscone   |
| <p>Organizers: <b>Suzanne M. Lenhart</b>, University of Tennessee</p> <p><b>Steven J. Schlicker</b>, Grand Valley State University</p> <p><b>J. Douglas Faires</b>, Youngstown State University</p> <p><b>Michael J. Dorff</b>, Brigham Young University</p>  | <p><b>REU and REV program at the new institute, NIMBioS.</b> Preliminary report.<br/><b>Suzanne Lenhart*</b>, University of Tennessee, and <b>Sarah Duncan</b>, National Institute for Mathematical and Biological Synthesis (1056-E5-263)</p> <p><i>Enhancing teaching and learning of undergraduate mathematics majors through transformative research and training in biological and bio-inspired systems.</i> Preliminary report.<br/><b>Kris Kappmeyer</b>, H-B Woodlawn, Arlington Public Schools, VA, <b>Sarah Minerva Venuti</b>, George Mason University, VA, <b>Courtney Marie Chancellor</b>, Southern Methodist University, TX, and <b>Padmanabhan Seshaiyer*</b>, George Mason University, VA (1056-E5-246)</p> <p><i>Collaborative Synthetic Biology Research for Undergraduates.</i><br/><b>Jeffrey L Poet*</b>, Missouri Western State University, and <b>Laurie J Heyer</b>, Davidson College (1056-E5-1164)</p> <p><i>Enriching the Major through a Comprehensive Scholarship Program.</i> Preliminary report.<br/><b>Deborah Lawrence*</b> and <b>Tina Alves Mancuso</b>, The Sage Colleges (1056-E5-1603)</p>  |
| <p>2:15PM<br/>► (347) <i>REU and REV program at the new institute, NIMBioS.</i> Preliminary report.<br/><b>Suzanne Lenhart*</b>, University of Tennessee, and <b>Sarah Duncan</b>, National Institute for Mathematical and Biological Synthesis (1056-E5-263)</p> <p>2:35PM<br/>► (348) <i>Enhancing teaching and learning of undergraduate mathematics majors through transformative research and training in biological and bio-inspired systems.</i> Preliminary report.<br/><b>Kris Kappmeyer</b>, H-B Woodlawn, Arlington Public Schools, VA, <b>Sarah Minerva Venuti</b>, George Mason University, VA, <b>Courtney Marie Chancellor</b>, Southern Methodist University, TX, and <b>Padmanabhan Seshaiyer*</b>, George Mason University, VA (1056-E5-246)</p> <p>2:55PM<br/>► (349) <i>Collaborative Synthetic Biology Research for Undergraduates.</i><br/><b>Jeffrey L Poet*</b>, Missouri Western State University, and <b>Laurie J Heyer</b>, Davidson College (1056-E5-1164)</p> <p>3:15PM<br/>► (350) <i>Enriching the Major through a Comprehensive Scholarship Program.</i> Preliminary report.<br/><b>Deborah Lawrence*</b> and <b>Tina Alves Mancuso</b>, The Sage Colleges (1056-E5-1603)</p> | <p><b>MAA Session on Preparing K-12 Teachers to Teach Algebra, I</b></p> <p>2:15 PM – 6:10 PM</p> <p style="text-align: center;">Room 2009,<br/>2nd Floor, Moscone</p> <p>Organizers: <b>Elizabeth Burroughs</b>, Montana State University</p> <p><b>Angela M. Hodge</b>, North Dakota State University</p> <p><b>William G. McCallum</b>, University of Arizona</p> <p>2:15PM<br/>► (358) <i>Developing a Comprehensive and Balanced Perspective on School Algebra Among Practicing Secondary School Mathematics Teachers.</i><br/><b>Xuhui Li</b>, California State University - Long Beach (1056-N1-2062)</p> <p>2:35PM<br/>► (359) <i>Helping teachers develop algebraic reasoning skills through investigation of algebraic proofs and mathematical discourse experiences.</i><br/><b>Tina Louise Johnston*</b>, Henry Gillow-Wiles and <b>Margaret L. Niess</b>, Oregon State University (1056-N1-2058)</p> <p>2:55PM<br/>► (360) <i>Extending from Multiplication of Two-Digit Numbers to Multiplication of Binomials and Beyond: Understanding the Learning Trajectory.</i> Preliminary report.<br/><b>Trisha A. Bergthold</b>, San Jose State University (1056-N1-2057)</p>   |

## Program of the Sessions – Wednesday, January 13 (cont'd.)

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3:15PM ► (361)	<i>Guiding Teachers to See Opportunities for Algebraic Reasoning in the Curriculum.</i> Preliminary report. <b>Dale R Oliver</b> , Humboldt State University (1056-N1-1927)	2:55PM ► (372)	<i>Beliefs of Liberal Arts Mathematics Students Regarding the Nature of Mathematics.</i> Preliminary report. <b>Stephen D. Szydlik</b> , University of Wisconsin-Oshkosh (1056-Q1-1549)
3:35PM ► (362)	<i>Connecting Mathematics and Pedagogy in Courses for Future Algebra Teachers.</i> <b>Rebecca H McGraw*</b> and <b>William McCallum</b> , University of Arizona (1056-N1-1804)	3:15PM ► (373)	<i>Mathematics Teachers' Circles.</i> Preliminary report. <b>Harold B Reiter*</b> and <b>Anthony Fernandes</b> , University of North Carolina Charlotte (1056-Q1-1267)
3:55PM ► (363)	<i>The Concept of Variable and the Logic of Solving Equations and Inequalities.</i> <b>Susanna Epp</b> , DePaul University (1056-N1-1800)	3:35PM ► (374)	<i>Helping Pre-Service Teachers Address their Tendency of Overgeneralizing Proportionality: Using Non-proportional Situations and Focusing on Quantities and Relationships.</i> <b>Kien H. Lim</b> , University of Texas at El Paso (1056-Q1-243)
4:15PM ► (364)	<i>Measuring the World: Preparing Elementary Teachers to Prepare Students for Algebra.</i> <b>Susan L. Addington</b> , California State University, San Bernardino (1056-N1-1786)	3:55PM ► (375)	<i>How Prospective Mathematics Teachers Define Mathematical Definitions.</i> <b>Nermin Tosmur - Bayazit</b> , Georgia State University (1056-Q1-1803)
4:35PM ► (365)	<i>A course in Mathematical Knowledge for Teaching for pre-service secondary teachers.</i> <b>Diana White</b> , University of Colorado Denver (1056-N1-1699)	4:15PM ► (376)	<i>What Do Students Hear in Statistics Classes: Empirical Results from a Study of Lexical Ambiguity.</i> Preliminary report. <b>Diane Fisher*</b> , University of Louisiana at Lafayette, <b>Jennifer Kaplan</b> , Michigan State University, and <b>Neal Rogness</b> , Grand Valley State University (1056-Q1-1060)
4:55PM ► (366)	<i>An Innovative Course in Elementary Number Theory for Preservice Teachers.</i> Preliminary report. <b>Agnes M Rash</b> , Saint Joseph's University, Philadelphia, PA (1056-N1-1643)	4:35PM ► (377)	<i>Do discussion boards improve statistical reasoning skills?</i> Preliminary report. <b>Edwin Prine Herman</b> , University of Wisconsin-Stevens Point (1056-Q1-1732)
5:15PM ► (367)	<i>On Line Number and Algebra for In-Service Middle School Math Teachers.</i> <b>Michael Mays*</b> and <b>David Miller</b> , West Virginia University (1056-N1-1477)	4:55PM ► (378)	<i>Strategies that worked for me in Teaching and Learning Undergraduate Mathematics.</i> <b>Joyati Debnath</b> , Winona State University, Winona, MN (1056-Q1-2007)
5:35PM ► (368)	<i>Dihedral Groups for Preservice Elementary Teachers.</i> <b>Leah Bridgers</b> , SUNY Oneonta (1056-N1-1475)		
5:55PM ► (369)	<i>Place Value - the Link Between Arithmetic and Success in Algebra.</i> <b>Murray H Siegel</b> , Arizona State University, Polytechnic (1056-N1-265)		

### MAA Session on The Scholarship of Teaching and Learning in Undergraduate Mathematics, II

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2:15 PM – 5:10 PM	Room 2011, 2nd Floor, Moscone
	Organizers: <b>Edwin P. Herman</b> , University of Wisconsin - Stevens Point
	<b>Nathan M. Wodarz</b> , University of Wisconsin - Stevens Point
2:15PM ► (370)	<i>Retention Benefits of Refocused College Algebra.</i> <b>Bernadette F. Turner*</b> and <b>Donna Stallings</b> , Lincoln University Jefferson City, MO (1056-Q1-1748)
2:35PM ► (371)	<i>Teaching Reform in College Algebra.</i> Preliminary report. <b>Jinfeng Wei*</b> , <b>Guangwei Fan</b> and <b>Min Deng</b> , Maryville University of St. Louis (1056-Q1-1177)

### MAA Session on The MAA SUMMA Program Turns 20—A Retrospective

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2:15 PM – 6:30 PM	Room 3002, 3rd Floor, Moscone
	Organizers: <b>William A. Hawkins Jr</b> , MAA and the University of the District of Columbia
	<b>Efraim Armendariz</b> , University of Texas at Austin
	<b>Camille A. McKayle</b> , University of the Virgin Islands
	<b>Robert E. Megginson</b> , University of Michigan, Ann Arbor
2:15PM ► (379)	<i>The San Antonio Prefreshman Engineering Program Turns 30 - A Retrospective.</i> <b>Manuel P. Berriozábal</b> , University of Texas at San Antonio (1056-G5-438)
2:35PM ► (380)	<i>Minorities and the MAA, Initial Steps.</i> <b>Lida K. Barrett</b> , Knoxville, TN (1056-G5-282)

## **Wednesday, January 13 – Program of the Sessions**

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| 2:55PM<br>► (381) | <i>Stengthening Underrepresented Minority Mathematics Achievement Intervention Programs.</i><br><b>Florence Fasanelli</b> , AAAS (1056-G5-87)   | 2:55PM<br>► (391)   | <i>Bougainville's Tratise du Calcul-Integral.</i><br>Preliminary report.<br><b>James J Tattersall</b> , Providence College (1056-H1-495)   |
| 3:15PM<br>► (382) | <i>Starting and Running an REU for Minorities and Women.</i><br><b>Dennis Davenport*</b> , National Science Foundation, and <b>Bonita Porter</b> , Miami University (1056-G5-2139)  | 3:15PM<br>(392)   | <i>Warren Colburn's "First Lessons in Arithmetic".</i><br><b>Andrew B. Perry</b> , Springfield College (1056-H1-1095)  |
| 3:35PM<br>► (383) | <i>Successful Intervention Programs in Mathematics for Undergraduates Historically Underrepresented in the Mathematics-based Disciplines.</i><br><b>James A. Mendoza Epperson</b> , The University of Texas at Arlington (1056-G5-1938) | 3:35PM<br>► (393)   | <i>"The Method of Rates:" The Books of Rice and Johnson.</i><br><b>George M. Rosenstein</b> , Franklin & Marshall College (1056-H1-553)  |
| 3:55PM<br>► (384) | <i>Some Challenges to Broadening Participation in Mathematics at the Undergraduate Level.</i><br><b>Sylvia T. Bozeman</b> , Spelman College (1056-G5-1054)  | 3:55PM<br>► (394)   | <i>Osgood's Theory of Functions.</i><br><b>Lawrence A. D'Antonio</b> , Ramapo College of New Jersey (1056-H1-234)  |
| 4:15PM<br>► (385) | <i>Speed Bumps and Potholes in the Road to Strengthening Underrepresented Minority Mathematics Achievement, Past, Present, and Future.</i><br><b>Robert E. Megginson</b> , University of Michigan (1056-G5-1176)                        | 4:15PM<br>► (395)   | <i>The Historian and the Mathematician: The Reception of the Biography by Michael Sean Mahoney of Pierre de Fermat.</i><br><b>Thomas Drucker</b> , University of Wisconsin-Whitewater (1056-H1-1842) |
| 4:35PM<br>(386)   | <i>Exploration of a Mathematics Enrichment Summer Camp for Underrepresented High School Students.</i><br><b>Sandra L. Richardson*</b> , Lamar University, and <b>David S. Torain</b> , Hampton University (1056-G5-1647)                | <hr/>   |  |
| 4:55PM<br>► (387) | <i>AIM Math Teachers' Circle Immersion Workshop.</i><br><b>Wade Ellis*</b> , West Valley College, and <b>Tatiana Shubin</b> , San Jose State University (1056-G5-1653)  | <hr/>   |  |
| 5:15PM<br>► (388) | <i>The Director of SUMMA looks at SUMMA past, present, and future.</i><br><b>William A. Hawkins</b> , MAA/University of the District of Columbia (1056-G5-1324)   | <hr/>   |  |
|                   |   | 2:15 PM - 6:30 PM   | Room 2002,<br>2nd Floor, Moscone   |
|                   |   | Organizers: <b>Willi Freeden</b> , University of Kaiserslautern<br><b>M. Zuhair Nashed</b> , University of Central Florida<br><b>Thomas H. Sonar</b> , Technical University of Braunschweig |  |
|                   |   | 2:15PM<br>(396)   | <i>Geomathematics - Role, Aims, and Potential.</i><br><b>Willi Freeden</b> , University of Kaiserslautern, Geomathematics Group  |

## **MAA Session on Mathematical Texts: Famous, Infamous, and Influential, II**

Organizers: **Fernando Q. Gouv  a**, Colby College  
**Amy Shell-Gellasch**, Beloit College

- ▶ (389) *For the good-hearted reader: Joost Bürgi, the history of logarithms, and a work that should have been famous.*  
**Kathleen M Clark**, Florida State University (1056-H1-1401)
  - ▶ (390) *Parallel Insight, Priority, and Pre-eminence: John Napier, Joost Bürgi, and Famous Works on Logarithms.*  
**Clemency J Montelle**, University of Canterbury (1056-H1-1018)

## ***SIAM Minisymposium on Frontiers in Geomathematics***

**2:15 PM - 6:30 PM**      **Room 2002,  
2nd Floor, Moscone**

Organizers: **Willi Freeden**, University of Kaiserslautern  
**M. Zuhair Nashed**, University of Central Florida  
**Thomas H. Sonar**, Technical University of Braunschweig

- 2:15PM (396) *Geomathematics - Role, Aims, and Potential.*  
**Willi Freeden**, University of Kaiserslautern, Geomathematics Group (1056-86-1128)

3:15PM ► (397) *Modeling the Geomagnetic Field by Locally Supported Wavelets.* Preliminary report.  
**Christian Gerhards**, TU Kaiserslautern (1056-86-1134)

3:45PM ► (398) *Modeling of Geothermal Flow.* Preliminary report.  
**Isabel Ostermann**, TU Kaiserslautern (1056-86-1135)

4:15PM (399) *Slepian Functions for Signal Estimation and Spectral Analysis.*  
**Frederik J Simons**, Princeton University (1056-86-1546)

4:45PM (400) *Spherical Harmonics, Splines and Wavelets — What Comes Next?*  
**Michel Volker**, Geomathematics Group Siegen (1056-65-1132)

5:15PM (401) *Eulerian-Lagrangian methods for multiphase multicomponent transport.*  
**Thomas F. Russell**, National Science Foundation (1056-65-1849)

## **Program of the Sessions – Wednesday, January 13 (cont'd.)**

- 5:45PM (402) *Randomizing the time in the heat equation and blind deconvolution of galaxy images.*  
**Alfred S. Carasso**, National Institute of Standards and Technology, Gaithersburg, MD

6:10PM (403) *Moment Problems in Reproducing Kernel Hilbert Spaces.*  
**M. Zuhair Nashed**, University of Central Florida (1056-65-2123)

## **MAA-Young Mathematicians' Network Poster Session**

**2:15 PM - 4:15 PM**      **Room 3001,  
3rd Floor, Moscone**

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

*MAA Panel Discussion*

**2:15 PM - 3:25 PM**      **Room 3004,  
3rd Floor, Moscone**

*Cultivating mathematical interest and talent of precollege students: Outreach through summer math camps and academies.*

Organizer: **Michelle L. Christ**, U.S. Air Force Academy

Panelists: **David Boliver**, University of Central Oklahoma  
**Peter Kuchment**, Texas A&M University  
**Lisa Rezac**, University of St. Thomas  
**Hortensia Soto-Johnson**, University of Northern Colorado  
**Max L. Warshauer**, Texas State University

*AWM Panel Discussion*

**2:15 PM - 3:40 PM**      **Room 2007,  
2nd Floor, Moscone**

*Dual careers or dueling careers? Jobs and the two-body problem.*

Moderator: **Georgia Benkart**, University of Wisconsin-Madison

Panelists: **Christine Min Wotipka**, Stanford University  
**Ellen Spertus**, Mills College and Google  
**David C. Manderscheid**, University of Nebraska-Lincoln  
**Maia Averett**, Mills College

## ***MAA Session on General Contributed Papers, III***

**2:30 PM - 4:25 PM**      **Room 3006,  
3rd Floor, Moscone**

**Organizers:** **Eric S. Marland**,  
Appalachian State University  
**Daniel J. Curtin**, Northern  
Kentucky University

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| 2:30PM<br>► (404) | <i>Proving in the Right Circles.</i><br><b>Linda McGuire</b> , Muhlenberg College<br>(1056-Z1-315)   |
| 2:45PM<br>► (405) | <i>Algebra in the K-5 Mathematics Curriculum: Keeping the Promise of Algebra for Every Age.</i><br><b>Judith Lynn Gieger</b> , Oglethorpe University (1056-Z1-1538)  |
| 3:00PM<br>► (406) | <i>Uncovering Buffon's Essai d'Arithmetique Morale.</i> Preliminary report.<br><b>Dominic W Klyve*</b> , Carthage College, and <b>Anna Lauren</b> , Abbot Laboratories (1056-Z1-1613)  |
| 3:15PM            | Break.   |
| 3:30PM<br>► (407) | <i>Comparison of Inquiry-Based Class Sessions and Lecture in the Context of Computer Assisted Algebra Instruction.</i> Preliminary report.<br><b>John C. Mayer</b> , University of Alabama at Birmingham (1056-Z1-1739)  |
| 3:45PM<br>► (408) | <i>Open, online, homework help forums: Fostering a culture in which communication reflects a conceptual orientation toward the attainment of quantitative reasoning and literacy skills.</i> Preliminary report.<br><b>Carla Currin van de Sande*</b> and <b>Frank S. Marfai</b> , Arizona State University (1056-Z1-1362) |
| 4:00PM<br>(409)   | <i>Teaching For Transfer And High Cognitive Demand Through The Use Of Discourse In Algebra.</i><br><b>Kimberly M Vincent</b> , Washington State University (1056-Z1-1892)  |
| 4:15PM<br>► (410) | <i>Closing the Gap: How Can Mathematics Instructors Empower Students for Academic Success in Future Mathematics Courses - Insights From the Developmental Psychology of Personal Mathematical Comprehension</i><br><b>Clyde L Greeno</b> , MALEI Mathematics Institute (1056-Z1-2012)                                      |

MAA Section Officers

**2:30 PM - 5:00 PM**      **Room 3014,  
3rd Floor, Moscone**

MAA Invited Address

**3:20 PM – 4:10 PM**      **Main Lecture Room,  
2nd Floor, Moscone**

- (411) *The factorial function, integer-valued polynomials, and  $p$ -adic calculus.*  
**Manjul Bhargava**, Princeton University



## **Program of the Sessions – Thursday, January 14 (cont'd.)**

## *AMS Special Session on Commutative Algebra, I*

8:00 AM - 11:50 AM	Room 3011, 3rd Floor, Moscone
	Organizers: <b>Susan Cooper</b> , University of Nebraska-Lincoln
	<b>Graham Leuschke</b> , Syracuse University
	<b>Sean M. Sather-Wagstaff</b> , North Dakota State University
8:00AM (428)	<i>What is a system of parameters?</i> Preliminary report. <b>Craig Huneke*</b> , University of Kansas, and <b>Louiza Fouli</b> , New Mexico St. University (1056-13-721)
8:30AM (429)	<i>Syzygy Theorem via Comparison of Order Ideals.</i> <b>Phillip A. Griffith</b> and <b>Alexandra Seceleanu*</b> , University of Illinois at Urbana-Champaign (1056-13-1439)

## **AMS Special Session on Geometric Aspects of Link and 3-manifold Invariants, II**

**8:00 AM - 11:50 AM**      **Room 3016,  
3rd Floor, Moscone**

8:00AM (436) *Reidemeister Torsion and the A-polynomial.*  
**Charles Frohman**, The University of Iowa, and **Joanna Kania-Bartoszynska**, National Science Foundation (1056-57-999)

8:30AM (437) *Quantum form of the Reidemeister torsion of a knot complement.*  
**Charles D. Frohman**, The University of Iowa, and **Joanna Kania-Bartoszynska\***, National Science Foundation (1056-57-1173)

9:00AM (438) *Higher Mahler measures.*  
**Matilde N Lalín**, University of Alberta (1056-11-442)

9:30AM ► (439) *First coefficient of the Conway polynomial of virtual links. Preliminary report.*  
**Sergei Chmutov**, Ohio State University, Mansfield (1056-57-705)

10:00AM (440) *Turaev genus, knot signature, and the knot homology concordance invariants.*  
**Oliver Dasbach**, Louisiana State University, and **Adam Lowrance\***, University of Iowa (1056-57-427)

## **Thursday, January 14 – Program of the Sessions**

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|------------------|--|------------------|--|
| 10:30AM<br>(441) | <i>Geometry of Lorenz knots.</i><br><b>Ilya Kofman</b> , College of Staten Island, City University of New York (1056-57-1710)  | 11:30AM<br>(450) | <i>Explicit isomorphisms of purely infinite simple Leavitt path algebras.</i> Preliminary report.<br><b>Chris Smith*</b> and <b>Gene Abrams</b> , University of Colorado, Colorado Springs (1056-16-866) |
| 11:00AM<br>(442) | <i>Adequate knots, guts, and volumes I: surfaces and polyhedra.</i><br>David Futer, Temple University, Efstratia Kalfagianni, Michigan State University, and Jessica S Purcell*, Brigham Young University (1056-57-1825)       |                  |  |
| 11:30AM<br>(443) | <i>Adequate knots, guts, and volumes II: volume and Jones polynomial.</i><br>David Futer*, Temple University, Efstratia Kalfagianni, Michigan State University, and Jessica S Purcell, Brigham Young University (1056-57-1913) |                  |  |

## **AMS Special Session on Graph Algebras in Analysis and Algebra, I**

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|--------------------|--|
| 8:00 AM - 11:50 AM | Room 3007,<br>3rd Floor, Moscone   |
|                    | Organizers: <b>Gene Abrams</b> , University of Colorado at Colorado Springs<br><b>Mark Tomforde</b> , University of Houston  |
| 8:00AM<br>(444)    | <i>Isomorphism and Morita equivalence of graph algebras I.</i><br><b>Gene Abrams</b> , University of Colorado at Colorado Springs, and <b>Mark Tomforde*</b> , University of Houston (1056-46-959)   |
| 8:30AM<br>(445)    | <i>Isomorphism and Morita equivalence of graph algebras II. Preliminary report.</i><br><b>Gene Abrams*</b> , University of Colorado at Colorado Springs, and <b>Mark Tomforde</b> , University of Houston (1056-16-943)                          |
| 9:00AM<br>(446)    | <i>Leavitt path algebras and graph C*-algebras of separated graphs, I. Preliminary report.</i><br><b>Pere Ara*</b> , Universitat Autònoma de Barcelona, and <b>Kenneth R. Goodearl</b> , University of California at Santa Barbara (1056-16-787) |
| 10:00AM<br>(447)   | <i>Leavitt path algebras and graph C*-algebras of separated graphs, II. Preliminary report.</i><br><b>P. Ara</b> , Universitat Autònoma de Barcelona, and <b>K.R. Goodearl*</b> , University of California at Santa Barbara (1056-16-828)        |
| 10:30AM<br>(448)   | <i>Nevanlinna-Pick interpolation for the Schur class associated with a directed graph.</i><br><b>Joseph A. Ball*</b> , Virginia Tech, and <b>Sanne ter Horst</b> , Utrecht University (1056-47-328)  |
| 11:00AM<br>(449)   | <i>Leavitt Path Algebras with Coefficients in a Noncommutative Ring.</i><br><b>Jennifer Firkins Nordstrom</b> , Linfield College (1056-16-1106)  |

## **AMS Special Session on Interactions of Inverse Problems, Signal Processing, and Imaging, I**

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| <p><b>8:00 AM – 11:40 AM</b></p> <p><b>Organizer:</b> <b>M. Zuhair Nashed,</b><br/>University of Central Florida</p> <p><b>8:00AM (451)</b> <i>Cramer-Rao Bound for Estimating Non-linear Parameters in a Model for Chemical Species Separation using Magnetic Resonance Imaging.</i><br/> <b>Emily K. Bice*</b>, California State University, Fullerton, <b>Venkata V. Chebrolu</b>, Department of Biomedical Engineering, University of Wisconsin, Madison, <b>Huanzhou Yu</b>, Global MR Applied Science Laboratory, GE Healthcare, Menlo Park, CA, <b>Jean H Brittain</b>, Global MR Applied Science Laboratory, GE Healthcare, Madison, WI, <b>Scott B. Reeder</b>, Department of Radiology, University of Wisconsin, Madison, and <b>Angel R. Pineda</b>, California State University, Fullerton (1056-62-1387)</p> <p><b>8:30AM (452)</b> <i>Sequential Lower Semi-Continuity of Non-Local Functionals.</i><br/> <b>Peter Elbau</b>, Johann Radon Institute for Computational and Applied Mathematics (1056-49-1514)</p> <p><b>9:00AM (453)</b> <i>On detection of small low emission sources.</i><br/> <b>Peter Kuchment*</b>, Texas A&amp;M University, <b>David Darrow</b>, UT Medical Branch at Galveston, <b>Yulia Hristova</b> and <b>Guido Kanschat</b>, Texas A&amp;M University (1056-35-1029)</p> <p><b>9:30AM (454)</b> <i>Compressed sensing via information theoretic methods.</i><br/> <b>Akram Aldroubi*</b> and <b>Haichao Wang</b>, Vanderbilt University (1056-94-843)</p> <p><b>10:00AM (455)</b> <i>Multiscale elasticity imaging.</i><br/> <b>Pierre Garapon*</b>, Stanford University, <b>Habib Ammari</b>, Ecole Polytechnique, and <b>François Jouve</b>, University Denis Diderot, PARIS VII (1056-35-1378)</p> <p><b>10:30AM (456)</b> <i>Reconstruction of Piecewise Constant Images Using Nonsmooth Nonconvex Minimization.</i><br/> <b>Mila Nikolova</b>, Centre de Mathematiques et de Leurs Applications (1056-49-2145)</p> <p><b>11:00AM (457)</b> <i>Beyond the Shannon-Nyquist Theorem.</i><br/> <b>Yves Meyer</b>, Centre de Mathematiques et de Leurs Applications (1056-41-2143)</p> | <p><b>Room 2000,</b><br/><b>2nd Floor, Moscone</b></p> |
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## Program of the Sessions – Thursday, January 14 (cont'd.)

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### AMS Special Session on Algebraic Methods in Signal Processing, I

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8:00 AM – 11:50 AM	Room 2008, 2nd Floor, Moscone
	Organizers: <b>Shamgar Gurevich</b> , University of California Berkeley <b>Ronny Hadani</b> , University of Chicago <b>Olga Holtz</b> , University of California Berkeley and Technical University Berlin <b>Oded Schwartz</b> , Technical University Berlin <b>Nir Sochen</b> , Tel Aviv University
8:00AM ► (458)	<i>Desired properties of identity codes.</i> Preliminary report. <b>Anant Sahai*</b> and <b>Kristen Ann Woyach</b> , UC Berkeley (1056-94-1688)
9:00AM ► (459)	<i>Group-Theoretic Algorithms for Matrix Multiplication.</i> <b>Chris Umans</b> , Caltech (1056-68-1303)
9:30AM ► (460)	<i>Polyphase Sequence Families with Low Correlation from the Bounds of Character Sums.</i> Preliminary report. <b>Gong Guang*</b> , Department of Electrical and Computer Engineering, University of Waterloo, and <b>Zilong Wang</b> , Beijing University (1056-94-1550)
10:00AM (461)	<i>Near Shannon limit low Peak to Average Power Ratio Turbo Block Coded OFDM.</i> <b>Vahid Tarokh*</b> , Maryam Sabaghian, Harvard University, <b>Besma Smida</b> , Purdue University, and <b>Yongjun Kwak</b> , Harvard University (1056-05-1043)
11:00AM (462)	<i>Algebra and Multi-Camera Networks.</i> <b>Nigel Boston</b> , University of Wisconsin - Madison (1056-94-1747)
11:30AM (463)	<i>On applications of non-commutative Fourier analysis in computational science.</i> <b>Hans Z Munthe-Kaas</b> , University of Bergen, Norway (1056-65-1148)

### AMS Special Session on The Mathematics of Information and Knowledge, I

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8:00 AM – 11:40 AM	Room 2012, 2nd Floor, Moscone
	Organizers: <b>Naoki Saito</b> , University of California Davis <b>Ronald R. Coifman</b> , Yale University <b>James G. Glimm</b> , SUNY at Stony Brook <b>Peter W. Jones</b> , Yale University <b>Mauro Maggioni</b> , Duke University <b>Jared Tanner</b> , University of Edinburgh

8:00AM (464)	<i>Harmonic Analysis and Geometries of Digital Data Bases.</i> <b>Ronald R. Coifman*</b> , Yale, and <b>Matan Gavish</b> , Stanford University (1056-65-1160)
9:00AM (465)	<i>Nonparametric Manifold Learning and Compressive Sensing.</i> <b>Lawrence Carin</b> , Duke University (1056-41-1525)
10:00AM (466)	<i>Affine-invariant Principal Components.</i> <b>Santosh S Vempala*</b> , Georgia Tech, and <b>S Charles Brubaker</b> , Pace Academy (1056-68-853)
11:00AM (467)	<i>Construction of a Large Class of Deterministic Sensing Matrices that Satisfy a Statistical Isometry Property.</i> <b>Robert Calderbank*</b> , Princeton University, <b>Stephen D Howard</b> , Defence Science and Technology Organisation, and <b>Sina Jafarpour</b> , Princeton University (1056-41-852)

### AMS Special Session on Voting Theory, I

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8:00 AM – 11:50 AM	Room 2010, 2nd Floor, Moscone
	Organizers: <b>Michael Jones</b> , Mathematical Reviews <b>Brian Hopkins</b> , Saint Peter's College <b>Tommy Ratliff</b> , Wheaton College
8:00AM ► (468)	<i>Minimal Requirements for Representation in the Democratic Primary.</i> <b>Jennifer M Wilson*</b> , Eugene Lang College the New School for Liberal Arts, and <b>Michael A Jones</b> , Mathematical Reviews (1056-91-732)
8:30AM ► (469)	<i>The Evaluation and Comparison of Thresholds for Divisor Methods.</i> <b>Michael A Jones*</b> , Mathematical Reviews, and <b>Jennifer M. Wilson</b> , Eugene Lang College of the New School University (1056-91-714)
9:00AM (470)	<i>Analysis of Cumulative Voting's Potential to Yield Fair Representation.</i> <b>Duane Cooper</b> , Morehouse College (1056-91-2017)
9:30AM (471)	<i>Algebraic Voting Theory.</i> <b>Michael E. Orrison</b> , Harvey Mudd College (1056-20-756)
10:00AM (472)	<i>Statistical Inconsistencies of Ranked Data.</i> <b>Anna E Bargagliotti*</b> , The University of Memphis, and <b>Michael Orrison</b> , Harvey Mudd College (1056-91-780)
10:30AM ► (473)	<i>Manipulating Profiles in Nonparametric Statistics: Stacking and Switching.</i> Preliminary report. <b>Sarah Berube</b> and <b>Karl-Dieter Crisman*</b> , Gordon College (1056-91-84)
11:00AM (474)	<i>Frequency of violations of monotonicity.</i> <b>Robert Z. Norman</b> , Dartmouth College (1056-91-1858)

## **Thursday, January 14 – Program of the Sessions**

- 11:30AM ► (475) *Concensus among Concensus Methods.*  
Preliminary report.  
**Anna Popova\*** and Michel  
Regenwetter, University of Illinois  
at Urbana-Champaign, Psychology  
(1056-91-620)

## **AMS Special Session on Analysis and Control Under Uncertainty, I**

- |                    | Room 2006,<br>2nd Floor, Moscone   |
|--------------------|--|
|                    | <b>Organizers:</b> <b>Xiaoming Wang</b> , Florida State University<br><b>Yanzhao Cao</b> , Auburn University<br><b>Catalin Trenchea</b> , University of Pittsburgh   |
| 8:00AM<br>(476)    | <i>The Estimation of functional uncertainty using Polynomial Chaos and adjoint equations.</i><br><b>Ionel Michael Navon*</b> , Dept of Scientific Computing/ Florida State University, K Alekseev Aleksey and M E Zelentsov, Moscow Institute of Physics and Technology (1056-93-1622) |
| 8:30AM<br>(477)    | <i>Long Time Behavior of Stochastically Forced PDEs.</i><br><b>Jonathan C. Mattingly</b> , Duke University (1056-37-1929)  |
| 9:00AM<br>(478)    | <i>Stochastic Analysis, Control and Nonlinear Filtering of Fluid Dynamic Models.</i><br><b>S. S. Sritharan</b> , Naval Postgraduate School (1056-60-507)   |
| 9:30AM<br>(479)    | <i>Optimal Parameter Tuning for Stability under Uncertainty.</i><br><b>Wolfgang Kliemann</b> , Iowa State University (1056-93-741)   |
| 10:00AM<br>► (480) | <i>A Non-Stochastic Talk on Stochastic Optimization / Control.</i><br><b>Ana-Maria Croicu</b> , Kennesaw State University (1056-49-1724)   |
| 10:30AM<br>► (481) | <i>Groundwater Reactive Transport Modeling under Uncertainty.</i><br><b>Ming Ye</b> , Department of Scientific Computing, Florida State University (1056-62-1564)  |
| 11:00AM<br>(482)   | <i>An Efficient Spectral Method for Acoustic Scattering from Rough Surfaces.</i><br><b>Jie Shen</b> , Purdue University (1056-65-1716)   |
| 11:30AM<br>(483)   | <i>Approximating long time statistical properties of large chaotic systems.</i><br><b>Xiaoming Wang</b> , Florida State University (1056-76-1971)  |

## **AMS Special Session on Applications of Time Scales to Biology, Economics, and Engineering, I**

Organizers: **Martin Bohner**, Missouri University of Science and Technology

**Billur Kaymakcalan,  
Georgia Southern  
University Statesboro**

**Allan Peterson**, University  
of Nebraska-Lincoln

- 8:00AM (484) *Eigenvalue intervals for a system of generalized second order three point nonlinear boundary value problems on a time scale.*  
**Johnny Henderson**, Baylor University (1056-34-27)

8:30AM (485) *Higher order singular multi-point boundary value problems on time scales.*  
**Abdulkadir Dogan**, University of Nigde, Nigde, Turkey, **John R Graef\*** and **Lingju Kong**, The University of Tennessee at Chattanooga (1056-39-746)

9:00AM (486) *The Existence of Multiple Nontrivial Solutions of Boundary Value Problems of Second-Order Dynamic Equations on a Time Scale.* Preliminary report.  
**Heidi A Berger**, Simpson College (1056-39-1540)

9:30AM (487) *Positive periodic solutions of functional differential equations on time scales and population models.*  
**Youssef Naim Raffoul\***, University of Dayton, and **Joan Hoffacker**, Clemson University (1056-37-806)

10:00AM (488) *Implications of time scales to spraying mosquitoes for West Nile prevention.*  
**Joan Hoffacker**, Clemson University (1056-34-1269)

10:30AM (489) *A predator-prey system on a time scale.* Preliminary report.  
**Nickolai Kosmatov**, University of Arkansas at Little Rock (1056-39-1491)

11:00AM ► (490) *A Ratio Dependent Predator-Prey System on a Time Scale.* Preliminary report.  
**Eric R. Kaufmann**, University of Arkansas at Little Rock (1056-92-1325)

11:30AM ► (491) *Model for antibiotic resistant bacteria in a river.* Preliminary report.  
**Bonita A Lawrence\*** and **Anna Mummert**, Marshall University (1056-34-1456)

## *AMS Special Session on Arithmetic Geometry. I*

**8:00 AM - 11:50 AM**      **Room 3005,  
3rd Floor, Moscone**

Organizers: **Bo-Hae Im**, Chung-Ang University

## **Program of the Sessions – Thursday, January 14 (cont'd.)**

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	<b>Jennifer Johnson-Leung,</b> University of Idaho <b>Jennifer Paulhus,</b> Kansas State University	
8:00AM (492)	<i>Generalizing a Theorem of Richard Brauer.</i> <b>Bo-Hae Im*</b> , Chung-Ang University, Seoul, and <b>Michael Larsen</b> , Indiana University (1056-11-1179)	9:00AM (502) <i>Environmental Modeling &amp; Big Projects: Lessons from Everglades Restoration Planning.</i> <b>Louis J. Gross</b> , Natl. Inst. for Math. & Biol. Synthesis University of Tennessee Knoxville (1056-BA-2121)
8:30AM (493)	<i>Numerical evidence for Bruinier-Yang conjecture and comparison with denominators of Igusa class polynomials.</i> <b>Kristin E. Lauter*</b> , Microsoft Research, <b>Bianca Viray</b> , University of California at Berkeley, <b>Jennifer Johnson-Leung</b> , University of Idaho, <b>Adriana Salerno</b> , Bates College, <b>Erika Frugoni</b> , University of Colorado, and <b>Helen Grundman</b> , Bryn Mawr College (1056-11-1633)	9:30AM ► (503) <i>Endangered Salmon in the Columbia River Basin.</i> <b>Roland H. Lamberson</b> , Humboldt State University (1056-BA-1714)
9:00AM (494)	<i>Bounds for the torsion subgroup of elliptic curves over fields with bounded ramification.</i> <b>Álvaro Lozano-Robledo*</b> , University of Connecticut - Storrs, and <b>Benjamin Lundell</b> , Cornell University (1056-11-1092)	
9:30AM (495)	<i>The growth of Mordell-Weil ranks on tower of Jacobians.</i> Preliminary report. <b>Guillermo Mantilla</b> , University of Wisconsin, Madison (1056-11-1083)	
10:00AM (496)	<i>Points on Quadratic Twists of <math>X_0(N)</math>.</i> <b>Ekin Ozman</b> , University of Wisconsin-Madison (1056-11-1529)	
10:30AM (497)	<i>Anti-Hasse Principles for Algebraic Curves.</i> <b>Pete L. Clark</b> , University of Georgia (1056-11-470)	
11:00AM (498)	<i>Cox rings of big rational surfaces.</i> <b>Damiano Testa</b> , University of Oxford, <b>Anthony Varilly-Alvarez*</b> , Rice University, and <b>Mauricio Velasco</b> , University of California at Berkeley (1056-14-1723)	
11:30AM ► (499)	<i>Equations of curves with automorphisms.</i> Preliminary report. <b>David J. Swinarski</b> , University of Georgia (1056-14-642)	

### **MAA Invited Paper Session on Environmental Modeling**

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8:00 AM – 9:50 AM	Room 3002, 3rd Floor, Moscone
	Organizers: <b>Karen D. Bolinger</b> , Clarion University <b>Ben Fusaro</b> , Florida State University
8:00AM ► (500)	<i>Warming, Non-linearity &amp; Civilization's Decline.</i> <b>Courtney Brown</b> , Dept of Political Science Emory University (1056-BA-1672)
8:30AM ► (501)	<i>Evolution of Competitive Co-existence.</i> <b>Jim M. Cushing</b> , University of Arizona (1056-BA-1678)

### **MAA Minicourse #3: Part A**

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8:00 AM – 10:00 AM	Pacific H, Marriott San Francisco
	<i>Educating about the state of the planet and sustainability while enhancing calculus.</i> Organizer: <b>Thomas J. Pfaff</b> , Ithaca College

### **MAA Minicourse #8: Part A**

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8:00 AM – 10:00 AM	Pacific I, Marriott San Francisco
	<i>The Fibonacci and Catalan numbers.</i> Organizer: <b>Ralph Grimaldi</b> , Rose-Hulman Institute of Technology

### **AMS Session on Biomathematics, I**

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8:00 AM – 11:55 AM	Room 3012, 3rd Floor, Moscone
8:00AM (504)	<i>Enhancement of cargo processivity by cooperating molecular motors.</i> <b>Filippo Posta*</b> , UCLA, <b>Maria R. D'Orsogna</b> , Cal State Northridge, and <b>Tom Chou</b> , UCLA (1056-92-58)
8:15AM ► (505)	<i>Influence of inhalation injury on mortality of burn patients.</i> <b>Fatemeh Emdad*</b> , The University of Texas Medical Branch, <b>Clarisse Djukom</b> , The university of Texas medical branch, <b>David N. Herndon</b> , UTMB, and <b>Marc G. Jeschke</b> , utmb (1056-92-170)
8:30AM (506)	<i>A fixed point theorem for a general epidemic model.</i> <b>Adam R. Lucas</b> , Saint Mary's College of California (1056-92-227)
8:45AM (507)	<i>Additive damage model for anti-cancer drug combinations.</i> <b>Ardith W El-Kareh</b> , Arizona Research Laboratories-Microcirculation, University of Arizona, <b>Leslie B. Jones*</b> , University of Arizona, and <b>Timothy W Secomb</b> , Department of Physiology, University of Arizona (1056-92-244)

## **Thursday, January 14 – Program of the Sessions**



# **AMS Session on Differential and Difference Equations, I**

**8:00 AM - 11:55 AM**      **Room 3018,  
3rd Floor, Moscone**

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| 8:00AM<br>(520) | <i>Correctors and Field Fluctuations for the <math>p_\epsilon(x)</math>-Laplacian with Rough Exponents.</i><br><b>Silvia Jimenez*</b> and <b>Robert Lipton</b> , Louisiana State University (1056-35-93)  |
| 8:15AM<br>(521) | <i>Maximizing distinguishability in optical tomography through selection of an optimal source: Function spaces and inner products.</i><br><b>Bonnie C Jacob</b> , Clemson University (1056-35-190)  |
| 8:30AM          | Break.  |
| 8:45AM<br>(522) | <i>A variational principle associated with a certain class of boundary value problems.</i><br><b>Abbas Momeni</b> , Queen's University (1056-35-436)  |
| 9:00AM<br>(523) | <i>Solutions for 2-Dimensional Coupled Kuramuro-Sivashinsky-KdV Equations.</i><br><b>Maomao Cai*</b> , Weber State University, <b>Dening Li</b> , West Virginia University, and <b>Chontita Rattanakul</b> , Mahidol University, Thailand (1056-35-490)                                       |
| 9:15AM<br>(524) | <i>On Nonlinear Evolution of Convective Flow in an Active Mushy Layer.</i><br><b>Dambaru Bhatta*</b> , The University of Texas-Pan American, <b>Mallikarjunaiah S. Muddamallappa</b> , Texas A&M University, and <b>Daniel N. Riahi</b> , The University of Texas-Pan American (1056-35-1213) |
| 9:30AM<br>(525) | <i>A Finite Difference Approximation for an Amphibian Juvenile-adult Migration System.</i><br><b>Azmy S. Ackleh</b> , <b>Keng Deng*</b> and <b>Qihua Huang</b> , University of Louisiana at Lafayette (1056-35-667)   |
| 9:45AM<br>(526) | <i>Stratified steady water waves.</i><br><b>Samuel Walsh</b> , Division of Applied Mathematics, Brown University (1056-35-681)  |

## Program of the Sessions – Thursday, January 14 (cont'd.)

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10:00AM (527)	<i>Stability of spherically propagating thermal frontal polymerization waves.</i> Preliminary report. <b>Vladimir A. Volpert and Esteban Urdiales*</b> , Northwestern University (1056-35-685)	8:45AM (538)	<i>A Metric for Homotopy Types.</i> Preliminary report. <b>Nicholas A Scoville</b> , Dartmouth College (1056-55-923)
10:15AM ► (528)	<i>Fractional differential equations for modeling anomalous diffusion in porous medium.</i> <b>Sergei Fomin*</b> , Khalifa University of Science, Technology and Research, and <b>Vladimir Chugunov</b> , Kazan State University (1056-35-807)	9:00AM (539)	<i>Stabilization of Homotopy Limits.</i> <b>Eric L Finster</b> , University of Virginia (1056-55-1616)
10:30AM (529)	<i>Asymptotic analysis for the 3D primitive equations in a channel.</i> <b>Chang-Yeol Jung*</b> , Ulsan National Institute of Science and Technology, <b>Roger Temam</b> , Indiana University, and <b>Makram Hamouda</b> , Dept. of Mathematics, Bizerte, Tunisia (1056-35-842)	9:15AM ► (540)	<i>The Third Torus Complex is Simply Connected.</i> <b>Brie A Finegold</b> , University of California at Santa Barbara (1056-55-1666)
10:45AM (530)	<i>The refractor problem with loss of energy and Monge - Ampère type of Equation.</i> <b>Cristian E Gutierrez and Henok Z Mawi*</b> , Temple University (1056-35-920)	9:30AM (541)	<i>Location of Zeros of Polynomials.</i> <b>C. Affane-Aji*</b> , Tuskegee University, N. <b>Agarwal</b> and <b>N. K. Govil</b> , Auburn University, AL (1056-32-1230)
11:00AM (531)	<i>Norm Estimates for Composite Operators Applied to Harmonic Forms.</i> Preliminary report. <b>Shusen Ding</b> , Seattle University (1056-35-978)		
11:15AM (532)	<i>Symbolic Computation of Conservation Laws of Nonlinear Partial Differential Equations.</i> <b>L. Douglas Poole*</b> and <b>Willy Hereman</b> , Colorado School of Mines (1056-35-1414)		
11:30AM (533)	<i>The Kawahara equation in weighted Sobolev spaces.</i> <b>Netra P. Khanal*</b> , University of Wisconsin - Washington County, <b>Jiahong Wu</b> , Oklahoma State University, and <b>Juan-Ming Yuan</b> , Providence University, Taiwan (1056-35-1100)		
11:45AM (534)	<i>The Generation and Propagation of Water Waves on a Running Stream.</i> <b>Lokenath Debnath</b> , University of Texas-Pan American (1056-35-1191)		

## AMS Session on Geometry and Topology, III

8:00 AM – 9:40 AM	Room 3010, 3rd Floor, Moscone		
8:00AM (535)	<i>Surfaces in generic toroidal 3-manifolds.</i> <b>Ryan Derby-Talbot</b> , Quest University Canada (1056-57-1742)	8:00AM (542)	<i>Triangular arrays induced from trigonometric functions.</i> <b>Hung-ping Tsao</b> , Novato, CA (1056-11-10)
8:15AM (536)	<i><math>A_\infty</math>-Bialgebras of Type <math>(m, n)</math>.</i> <b>Ainhoa Berciano</b> , Universidad del País Vasco-Euskal Herriko Unibertsitatea, <b>Sean Evans</b> , University of Pittsburgh, and <b>Ronald Umble*</b> , Millersville University of Pennsylvania (1056-55-161)	8:15AM (543)	<i>Gross-Zagier subgroups of elliptic curves over <math>\mathbb{Q}</math>.</i> <b>William A Stein</b> , University of Washington (1056-11-22)
8:30AM (537)	<i>Homomorphisms of <math>L_\infty</math> Modules.</i> <b>Michael P. Alcocka</b> , North Carolina State University (1056-55-544)	8:30AM (544)	<i>Construction of Even Length Binary Sequences with High Asymptotic Merit Factor.</i> Preliminary report. <b>Tingyao Xiong*</b> and <b>Hall I. Jonathan</b> , Michigan State University (1056-94-537)
		8:45AM (545)	<i>The Value of the Zeta Function at an Odd Argument.</i> <b>Badih N. Ghusayni</b> , Lebanese University (1056-11-133)
		9:00AM ► (546)	<i>Arithmetic Progressions on Curves of Degree Five.</i> <b>Alejandra Alvarado</b> , University of Arizona (1056-11-171)
		9:15AM ► (547)	<i>On Generalization of Lambert Series.</i> <b>Tom Osler</b> , Rowan University, and <b>Abdul Hassen*</b> , Rowan University (1056-11-1400)
		9:30AM (548)	<i>The fluctuations in the number of points on a family of curves over a finite field.</i> <b>Maosheng Xiong</b> , Pennsylvania State University (1056-11-200)
		9:45AM (549)	<i>More Sums than Differences Sets and Beyond.</i> <b>Yufei Zhao</b> , Massachusetts Institute of Technology (1056-11-343)
		10:00AM (550)	<i>Minimal product sets sizes in nonabelian groups.</i> <b>Yakov I Berchenko-Kogan</b> , California Institute of Technology (1056-11-360)
		10:15AM (551)	<i>An Infinite Family of Recursive Formulas Generating Power Moments of Kloosterman Sums with Trace One Arguments: <math>O(2n+1, 2^r)</math> Case.</i> <b>Dae San Kim</b> , Sogang University (1056-11-430)

## Thursday, January 14 – Program of the Sessions

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<p>10:30AM ► (552) <i>Perfect Parallelepipeds Exist.</i> Jorge F Sawyer* and Clifford A Reiter, Lafayette College (1056-11-500)</p> <p>10:45AM ► (553) <i>On the Convergence of Maximum Roots of a Fibonacci Type Polynomial Sequence.</i> Robert Molina, Alma College, and Aklilu Zeleke*, Michigan State University (1056-40-1660)</p> <p>11:00AM (554) <i>On the zeros of Epstein zeta functions.</i> Yoonbok Lee, Yonsei University (1056-11-570)</p> <p>11:15AM ► (555) <i>Galois theory for tame dodecic local fields.</i> Chad Awtry, Arizona State University (1056-11-631)</p> <p>11:30AM (556) <i>Arithmetic of Curves and Error-Correction.</i> Radoslav M Kirov* and Iwan M Duursma, University of Illinois at Urbana-Champaign (1056-11-697)</p> <p>11:45AM (557) <i>Two Identities Involving Generalized Fibonacci Numbers.</i> Curtis N. Cooper, University of Central Missouri (1056-11-1210)</p>	<p>10:00AM (564) <i>Movie Recommendation Systems.</i> Erich Kreutzer, Davidson College (1056-J5-1711)</p> <p>10:20AM ► (565) <i>Searching for the home base of a serial criminal.</i> Mike O'Leary, Towson University (1056-J5-811)</p> <p>10:40AM ► (566) <i>Statistical Inconsistency in the Audit Risk Model.</i> Preliminary report. Richard J Cleary, Bentley University (1056-J5-1736)</p> <p>11:00AM ► (567) <i>Scoring line of best fit test questions.</i> James H Fife, Educational Testing Service (1056-J5-783)</p> <p>11:20AM ► (568) <i>An Alternative Distributional Model for Control of Process Particle Counts in the Semiconductor Industry.</i> Robert K. Henderson, Stephen F. Austin State University, Nacogdoches, TX (1056-J5-1384)</p> <p>11:40AM (569) <i>Calculating the Greeks via Malliavin Calculus for Variance Gamma Process in Poisson-Wiener Space.</i> Dervis Bayazit* and Craig A Nolder, Florida State University (1056-J5-1727)</p>
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### **MAA Session on Mathematics Experiences in Business, Industry, and Government**

8:00 AM – 11:55 AM		Room 2011, 2nd Floor, Moscone
Organizers: Philip Gustafson, Mesa State College Michael Monticino, University of North Texas		
8:00AM ► (558)	A Robust, Multi-Criteria Modeling Approach for Optimizing Aeromedical Evacuation Asset Emplacement.	Nathaniel D Bastian, United States Army (1056-J5-113)
8:20AM (559)	The US blood supply, bioterrorism and mathematics.	Sonja Sandberg, Framingham State College (1056-J5-1600)
8:40AM (560)	Using Radar to Identify Persons Carrying Wires.	William P Fox*, Naval Postgraduate School, John Vesely, University of Ca-Santa Cruz, and Kip Laws, University of CA, Santa Cruz (1056-J5-750)
9:00AM ► (561)	Probability in Solutions for Assembly in Earth Orbit of a NASA Spacecraft for Travel to Mars.	Richard D Jarvinen, Winona State University (1056-J5-583)
9:20AM (562)	A Green's Function Technique for Radiation Transport in Three Dimensions.	Candice Rockell* and John Tweed, Old Dominion University (1056-J5-788)
9:40AM ► (563)	Why companies need mathematicians even during rough times.	Carla D Martin, James Madison University (1056-J5-2085)

### **MAA Session on General Contributed Papers, V**

8:00 AM – 11:55 AM		Room 3000, 3rd Floor, Moscone
Organizers: Eric S. Marland, Appalachian State University Daniel J. Curtin, Northern Kentucky University		
8:00AM ► (570)	When uniformity must be replaced by non-uniformity: on finite difference approximations of the Black-Scholes equation on non-uniform grids.	Preliminary report. Daniel D. Sheng*, Westwood High School, and Myles D. Baker, Baylor University (1056-Z1-1094)
8:15AM (571)	A Lagrange Interpolation Mean Convergence.	Javad Namazi, FDU (1056-Z1-332)
8:30AM (572)	$L_\infty$ Algebras and Symmetric Braces.	Mindy Beth Capaldi, North Carolina State University (1056-Z1-610)
8:45AM ► (573)	Fibonacci Numbers and Collections of Mutually Disjoint Convex Subsets of a Totally Ordered Set.	Tyler Clark*, Western Kentucky University Honors College, and Tom Richmond, Western Kentucky University (1056-Z1-1279)
9:00AM ► (574)	Generating Pythagorean Triples.	Constance C Edwards, California University of Pennsylvania (1056-Z1-1307)
9:15AM ► (575)	A New Characterization of Dimension Zero. Preliminary report. Jay Stine, Misericordia University (1056-Z1-451)	

## **Program of the Sessions – Thursday, January 14 (cont'd.)**

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| 9:30AM<br>► (576)  | <i>A Lesson Study in Real Analysis.</i><br>Preliminary report.<br><b>Brigitte Lahme*</b> , <b>Jerry Morris</b> and<br><b>Elaine Newman</b> , Sonoma State University<br>(1056-Z1-1762)  | 8:00AM<br>► (586)  | <i>A First Year Seminar on Exploring Data for Social Change.</i> Preliminary report.<br><b>Maria G Fung</b> , Worcester State College<br>(1056-H7-2081)   |
| 9:45AM<br>► (577)  | <i>Inquiry-Based Learning for Middle and High School Mathematics Teachers - Part I.</i> Preliminary report.<br><b>Shing S. So*</b> and <b>Mahmoud Yousef</b> ,<br>University of Central Missouri<br>(1056-Z1-1214)  | 8:20AM<br>► (587)  | <i>Teaching Mathematics and Democracy.</i><br>Preliminary report.<br><b>Maura Mast</b> , University of Massachusetts Boston (1056-H7-1989)  |
| 10:00AM<br>► (578) | <i>Inquiry-Based Learning for Middle and High School Mathematics Teachers - Part II.</i> Preliminary report.<br><b>Mahmoud Yousef*</b> and <b>Shing S. So</b> , University of Central Missouri<br>(1056-Z1-1217)  | 8:40AM<br>► (588)  | <i>Gender Inequity in the National Merit Scholarship Program.</i><br><b>Bryan Nankervis</b> , Texas State University-San Marcos (1056-H7-940)   |
| 10:15AM<br>(579)   | <i>A model for high-school teacher professional development and student learning.</i><br><b>Galen E. Turner*</b> , <b>James D. Nelson</b> ,<br><b>Kelly B. Crittenden</b> and <b>Jane A. Petrus</b> ,<br>Louisiana Tech University (1056-Z1-1152)         | 9:00AM<br>► (589)  | <i>Keeping the Doors Open: A Summer Algebra Camp for Under-represented Minority Middle School Students.</i><br><b>J B Fink*</b> and <b>E D Nordmoe</b> , Kalamazoo College (1056-H7-300)  |
| 10:30AM<br>(580)   | <i>Middle Mathematics Mobilization Program for Middle School Teachers.</i><br><b>Aaron K Trautwein</b> , Carthage College, Kenosha Wisconsin (1056-Z1-1292)   | 9:20AM<br>► (590)  | <i>Changing Teachers' Concept of Mathematics with the Goal of Providing Equal Opportunity for All Students to Succeed in Learning Algebra.</i><br><b>Judith M. Kysh*</b> and <b>Diane Resek</b> , San Francisco State University (1056-H7-991)          |
| 10:45AM<br>► (581) | <i>Being a Student Again: My Summer in a Research Experience for K-12 Teachers.</i><br><b>Erin Elizabeth Pitney</b> , Beaverton School District (1056-Z1-1941)  | 9:40AM<br>► (591)  | <i>Creative Mathematics for All? A Survey of Preservice Teachers' Attitudes about Students' Capabilities.</i> Preliminary report.<br><b>Deborah E Berg</b> , University of Nebraska-Lincoln (1056-H7-1558)  |
| 11:00AM<br>(582)   | <i>How Might We Prepare Pre-Service High School Teachers to Teach Using Computer Algebra Systems?</i><br><b>Tom Fox</b> , University of Houston-Clear Lake (1056-Z1-2080)   | 10:00AM<br>► (592) | <i>Service Learning in Support of Financial Literacy.</i><br><b>Andrew Miller</b> , Belmont University (1056-H7-885)  |
| 11:15AM<br>(583)   | <i>Mathematics workshops for parents and children as hybrid spaces.</i><br><b>Jose Maria Menendez</b> , Radford University (1056-Z1-827)  | 10:20AM<br>► (593) | <i>Mathematics as a Subversive Activity - Questioning Authority and Promoting Independent Thinking.</i><br><b>Jack Bookman</b> , Duke University (1056-H7-486)  |
| 11:30AM<br>► (584) | <i>Projects to Enhance Revised Algebra and Functions.</i><br><b>Kenneth J Bernard</b> , Virginia State University (1056-Z1-1192)  | 10:40AM<br>► (594) | <i>Math and Social Issues.</i> Preliminary report.<br><b>Mouchumi Bhattacharyya</b> , <b>Christopher Goff</b> and <b>Larry J Langley*</b> , University of the Pacific (1056-H7-1696)  |
| 11:45AM<br>► (585) | <i>A Classroom Project on Protecting Social Security Numbers from Identity Theft.</i><br><b>Yajun Yang*</b> , Farmingdale State College, State University of New York, and<br><b>Katherine Zhu</b> , Massachusetts Institute of Technology (1056-Z1-1458) | 11:00AM<br>(595)   | <i>Social justice in the classroom through real-world examples.</i><br><b>Lily S. Khadjavi</b> , Loyola Marymount University (1056-H7-1450)   |
|                    |   | 11:20AM<br>► (596) | <i>A Pan-African Model for Developing Mathematical Talent in Africa.</i><br><b>Josephine Davis Davis*</b> , Quality Education for Minorities/Fort Valley State University, and <b>Monica Mitchell</b> , Quality Education for Minorities (1056-H7-1932) |
|                    |   | 11:40AM<br>► (597) | <i>Teaching Numerical Analysis in Cambodia.</i><br><b>Angel R. Pineda</b> , California State University, Fullerton (1056-H7-1663)   |

# **MAA Session on Mathematics, Equity, Diversity, and Social Justice, I**

**8:00 AM - 11:55 AM**      **Room 2022,  
2nd Floor, Moscone**

Organizers: **Patricia Hale**, California State Polytechnic University Pomona  
**Shandy Hauk**, University of Northern Colorado  
**Dave Kung**, St. Mary's College Maryland

## **MAA Session on Experiences that Enrich the Education of Mathematics Majors. II**

**8:00 AM - 9:15 AM**      **Room 3008,  
3rd Floor, Moscone**

Organizers: **Suzanne M. Lenhart**,  
University of Tennessee

## Thursday, January 14 - Program of the Sessions

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	<b>Steven J. Schlicker</b> , Grand Valley State University	10:20AM (609)	<i>Liberal Arts Math - An Activity Based Class.</i>
	<b>J. Douglas Faires</b> , Youngstown State University		<b>Ann C Hanson</b> , Columbia College Chicago (1056-J1-1618)
	<b>Michael J. Dorff</b> , Brigham Young University	10:40AM ► (610)	<i>Borrowing literary structures for mathematics lessons.</i> Preliminary report. <b>Teresa E. Moore*</b> , Ithaca College, and L. Christine Kinsey, Canisius College (1056-J1-1630)
8:00AM ► (598)	<i>Creating a Departmental Culture of Enriching Experiences.</i> <b>G. Daniel Callon</b> , Franklin College (1056-E5-1979)	11:00AM ► (611)	<i>Geometry and Renaissance Paintings.</i> <b>Daniel F Pinzon</b> , University of Arkansas at Fort Smith (1056-J1-2055)
8:20AM ► (599)	<i>Engaging math majors in education research.</i> <b>Diana White</b> , University of Colorado Denver (1056-E5-1708)	11:20AM ► (612)	<i>Applications of Mathematics: Using Multi-Media Curriculum to Teach Mathematics to Liberal Arts Majors.</i> Preliminary report. <b>Barbara L Hess</b> , California University of Pennsylvania (1056-J1-964)
8:40AM ► (600)	<i>Enriching the education of mathematics majors with career seminars, undergraduate student research, and student events at MAA sectional meetings.</i> Preliminary report. <b>Katarzyna Potocka</b> , Ramapo College of New Jersey (1056-E5-561)		
9:00AM ► (601)	<i>Combining Mathematics History with a Greece Tour.</i> Preliminary report. <b>Sharon S. Emerson-Stonell</b> , Longwood University (1056-E5-573)		

### MAA Session on Mathematics Courses for the Liberal Arts Students, I

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8:00 AM - 11:35 AM	Room 2024, 2nd Floor, Moscone
	Organizer: <b>Reva Kasman</b> , Salem State College
8:00AM ► (602)	<i>Using CLA in the Classroom Performance Tasks for Assessment in a Quantitative Reasoning Course.</i> Preliminary report. <b>Gerald W. Kruse</b> , Juniata College (1056-J1-1118)
8:20AM ► (603)	<i>Egyptian Fractions.</i> Preliminary report. <b>Bill Linderman</b> , King College (1056-J1-1907)
8:40AM ► (604)	<i>Ethnomathematics as an Interdisciplinary Outreach Course.</i> <b>Darrah Chavey</b> , Beloit College (1056-J1-1481)
9:00AM ► (605)	<i>The Mystical Math Room.</i> <b>Mairead K Greene</b> , Rockhurst University (1056-J1-2040)
9:20AM ► (606)	<i>The Mathematics of Powered Flight. The airplane course revisited.</i> <b>George Rublein</b> , College of William and Mary (1056-J1-1756)
9:40AM (607)	<i>How to Include More of the Arts in Mathematics for Liberal Arts.</i> <b>Julian F Fleron*</b> , Volker Ecke, Christine von Renessee and Philip K Hotchkiss, Westfield State College (1056-J1-2008)
10:00AM ► (608)	<i>The Whole Truth about Whole Numbers.</i> Preliminary report. <b>Agnes M Rash</b> , Saint Joseph's University, Philadelphia, PA (1056-J1-1584)

### MAA Session on Using Computer Algebra Systems in the Calculus Sequence

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8:00 AM - 10:35 AM	Room 2020, 2nd Floor, Moscone
	Organizer: <b>William Marion</b> , Valparaiso University
8:00AM ► (613)	<i>Related Rates.</i> <b>Leon Brin</b> , Southern CT State University (1056-R1-880)
8:20AM ► (614)	<i>Interactive Chaos Mathlets for Calculus I.</i> Preliminary report. <b>Karl-Dieter Crisman</b> , Gordon College (1056-R1-1288)
8:40AM ► (615)	<i>Exploratory Labs in Multivariable Calculus.</i> Preliminary report. <b>William E Fenton</b> , Bellarmine University (1056-R1-1382)
9:00AM ► (616)	<i>Why do we need intervals for the First Derivative Test?</i> Preliminary report. <b>Daniel Maxin</b> , Valparaiso University (1056-R1-317)
9:20AM ► (617)	<i>Gabriel's Other Equipment.</i> Preliminary report. <b>Melvin G. Royer</b> , Indiana Wesleyan University (1056-R1-255)
9:40AM ► (618)	<i>Exploring Velocity and Acceleration Vectors Visually.</i> Preliminary report. <b>Paul E. Seeburger</b> , Monroe Community College (1056-R1-1779)
10:00AM ► (619)	<i>In search of the big bubble.</i> <b>Andrew J Simoson</b> , King College (1056-R1-410)
10:20AM ► (620)	<i>Illustrating Gradients.</i> <b>Robert P. Webber</b> , Longwood University (1056-R1-488)

### MAA Session on Engaging Students with Classroom Voting

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8:00 AM - 11:55 AM	Room 2009, 2nd Floor, Moscone
	Organizers: <b>Derek Bruff</b> , Vanderbilt University

## **Program of the Sessions – Thursday, January 14 (cont'd.)**

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	Kien Lim, University of Texas at El Paso Kelly Cline, Carroll College
8:00AM ► (621)	<i>Use of Classroom Voting In Liberal Arts College Classes (Small and Large).</i> Preliminary report. <b>Ron Buckmire</b> , Occidental College (1056-E1-279)
8:20AM ► (622)	<i>Clickers in the Classroom.</i> <b>Kimberly Jordan Burch</b> , Indiana University of Pennsylvania (1056-E1-268)
8:40AM ► (623)	<i>Classroom Voting: Using Students' Responses to Write Better Questions.</i> <b>M. McGivney-Burelle Jean</b> , University of Hartford (1056-E1-1619)
9:00AM ► (624)	<i>Utilizing Personal Response Systems (Clickers) in Liberal Arts Mathematics Courses to Support a Lecture Format.</i> Preliminary report. <b>Janet A White</b> , Millersville University of PA (1056-E1-1348)
9:20AM (625)	<i>Using Clickers in a Refocused College Algebra Course - Part I.</i> <b>Erick B Hofacker*</b> and <b>Kay Shager</b> , University of Wisconsin - River Falls (1056-E1-1985)
9:40AM ► (626)	<i>Preservice Elementary Teachers' Perceptions of Clicker Use in their College Mathematics Course.</i> <b>Travis K Miller</b> , Millersville University of Pennsylvania (1056-E1-682)
10:00AM ► (627)	<i>Using Classroom Response Systems in Mathematics to Facilitate Discourse, Reasoning, and Representations in the Development of Mathematical Content Teacher Knowledge.</i> <b>Sherrie J Serros*</b> , University of Wisconsin - Eau Claire, <b>Kathryn T Ernie</b> and <b>Erick B Hofacker</b> , University of Wisconsin - River Falls (1056-E1-2009)
10:20AM ► (628)	<i>Using Classroom Voting to Address Students' Probability Misconceptions.</i> <b>Tami K. Dashley</b> , University of Texas at El Paso (1056-E1-618)
10:40AM (629)	<i>A randomized experiment exploring features of clicker use and their impact on undergraduate students' engagement and learning in statistics.</i> <b>Herle M. McGowan*</b> , North Carolina State University, <b>Brenda K. Gunderson</b> and <b>Vijay N. Nair</b> , University of Michigan (1056-E1-414)
11:00AM (630)	<i>Classroom voting in an introductory real analysis course.</i> <b>L Pedro Poitevin</b> , Salem State College (1056-E1-1053)
11:20AM ► (631)	<i>Clicker examples versus board examples in Calculus: how are they different?</i> <b>Kim Roth*</b> , Juniata College, and <b>Lynn Cockett</b> , Juniata College, Communications Department (1056-E1-1759)

11:40AM ► (632)	<i>Using Clickers in Advanced Undergraduate Mathematics Courses.</i> <b>Patti Frazer Lock</b> , St. Lawrence University (1056-E1-1248)
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## **SIAM Minisymposium on High School Outreach to Introduce Students to Applied Mathematics**

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8:00 AM – 10:55 AM	<b>Room 2002, 2nd Floor, Moscone</b>
	Organizer: <b>Peter Turner</b> , Clarkson University
8:00AM ► (633)	<i>Applied Mathematics for High School Outreach.</i> <b>Peter R Turner</b> , Clarkson University (1056-97-386)
8:35AM ► (634)	<i>Soap and Slope: Exploration of gradients through hands-on experiments with surfactants (outreach module for grades 7-12).</i> <b>Rachel Levy</b> , Harevy Mudd College (1056-97-840)
9:25AM ► (635)	<i>Probability and Determinism at the Battle of Trafalgar.</i> <b>Daniel J Teague</b> , NC School of Science and Mathematics (1056-97-606)
10:10AM (636)	<i>K-12 Outreach with Integrated Math and Physics for Roller Coaster Design.</i> <b>Kathleen R Fowler*</b> , <b>Peter Turner</b> , <b>David Wick</b> and <b>Michael Ramsdell</b> , Clarkson University (1056-97-871)

## **MAA-Project NExT Panel Discussion**

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8:00 AM – 9:15 AM	<b>Room 3024, 3rd Floor, Moscone</b>
	<i>Teaching calculus to students who have had AP calc: Challenges and solutions.</i>
	Organizers: <b>Timothy P. Chartier</b> , Davidson College
	<b>Stephanie Salomone</b> , University of Portland
	Panelists: <b>Michael E. Boardman</b> , Pacific University
	<b>David M. Bressoud</b> , Macalester College
	<b>Stephen L. Davis</b> , Davidson College
	<b>Deborah Hughes-Hallett</b> , University of Arizona
	<b>Francis E. Su</b> , Harvey Mudd College

## **Employment Center**

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8:00 AM – 7:00 PM	<b>Exhibit Hall, Moscone</b>
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## Thursday, January 14 – Program of the Sessions

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### **MAA Invited Address**

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**9:00 AM – 9:50 AM**                   **Main Lecture Room,  
2nd Floor, Moscone**

- (637) *Reasonable effectiveness: Trigonometry, ancient astronomy, and the birth of applied mathematics.*  
**Glen Van Brummelen**, Quest University  
(1056-A0-2)

### **MAA Minicourse #10: Part A**

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**9:00 AM – 11:00 AM**                   **Pacific J, Marriott  
San Francisco**

- The hitchhiker's guide to mathematics.*  
Organizers: **Dan Kalman**, American University  
**Bruce F. Torrence**, Randolph Macon College

### **Student Hospitality Center**

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**9:00 AM – 5:00 PM**                   **South Lobby,  
2nd Floor, Moscone**

### **MAA Committee on Technology in Mathematics Education Panel Discussion**

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**9:00 AM – 10:20 AM**                   **Room 3006,  
3rd Floor, Moscone**

- Online articles from JOMA to Loci.*  
Organizers: **Thomas E. Leathrum**, Jacksonville State University  
**Lawrence Moore**, Duke University  
Panelists: **Nathaniel Miller**, University of Northern Colorado  
**Kady Schneiter**, Utah State University  
**Lee Stemkoski**, Adelphi University

### **MAA Session for Department Chairs**

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**9:00 AM – 10:20 AM**                   **Room 3004,  
3rd Floor, Moscone**

- Assessment of student learning outcomes: Opportunity and challenge.*  
Organizers: **Daniel P. Maki**, Indiana University  
**Catherine M. Murphy**, Purdue University Calumet  
Panelists: **Jay A. Malmstrom**, Oklahoma City Community College  
**Catherine M. Murphy**  
**Nalsey B. Tinberg**, Occidental College

### **MAA Committee on the Participation of Women/Women in Mathematics Network Poster Session**

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**9:00 AM – 11:00 AM**                   **Room 3001,  
3rd Floor, Moscone**

- Mathematical outreach programs for underrepresented populations.*  
Organizer: **Elizabeth G. Yanik**, Emporia State University

### **AMS Special Presentation**

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**9:30 AM – 11:00 AM**                   **Room 3020,  
3rd Floor, Moscone**

- Who wants to be a mathematician—national contest.*

### **MAA-Project NExT Panel Discussion**

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**9:30 AM – 10:50 AM**                   **Room 3024,  
3rd Floor, Moscone**

- How one can become a referee/reviewer.*  
Organizers: **Joseph A. Gallian**, University of Minnesota-Duluth  
**Aparna W. Higgins**, University of Dayton  
**T. Christine Stevens**, Saint Louis University  
Panelists: **Matthias Beck**, San Francisco State University  
**Frederick Hoffman**, Florida Atlantic University  
**Carl Pomerance**, Dartmouth College  
**Brigitte Servatius**, Worcester Polytechnic Institute

### **Exhibits and Book Sales**

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**9:30 AM – 5:30 PM**                   **Exhibit Hall, Moscone**

### **MAA Invited Paper Session on Gems of Number Theory**

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**10:00 AM – 11:55 AM**                   **Room 3008,  
3rd Floor, Moscone**

- Organizers: **Thomas Koshy**, Framingham University  
**Shannon Lockard**, Bridgewater State College  
10:00AM ► (638) *Ramanujan Reaches His Hand from His Grave to Snatch Your Theorems From You.*  
**Bruce C Berndt**, University of Illinois (1056-BB-530)  
10:30AM (639) *Combinatorial Proofs of Congruences.*  
**Ira M. Gessel**, Brandeis University (1056-BB-632)

## Program of the Sessions – Thursday, January 14 (cont'd.)

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- 11:00AM *Counting points on elliptic curves, from Gauss to the present.*  
► (640) *Alice Silverberg*, University of California, Irvine (1056-BB-607)
- 11:30AM *Sage: Creating a Viable Free Open Source Alternative to Magma, Maple, and Mathematica for Number Theory.*  
► (641) *William A Stein*, University of Washington (1056-BB-510)

Moderator: **Martin Davis**, Courant Institute of Mathematical Sciences  
Panelists: **Bjorn Poonen**, M.I.T.  
**Karl Rubin**, University of California, Irvine  
**Alexandra Shlapentokh**, East Carolina University

### AMS Session on Probability and Statistics, III

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- 10:00 AM – 11:55 PM Room 3010,  
3rd Floor, Moscone
- 10:00AM *Coherent risk measure for multivariate Pareto distributed losses.* Preliminary report.  
(642) *Li Zhu\** and *Haijun Li*, Washington State University (1056-62-2147)
- 10:15AM *Spatial Birth-Death-Swap Chains.*  
(643) *Mark L Huber*, Claremont McKenna College (1056-60-1068)
- 10:30AM *A Stochastic Approach to the Bonus-Malus System.* Preliminary report.  
► (644) *Kumer Pial Das*, Lamar University (1056-60-980)
- 10:45AM *Proper quantization of multiplexer circuits, history dependent Parrondo games, and certain Markov processes.*  
(645) *Steven A. Bleiler* and *Faisal Shah Khan\**, Portland State University (1056-81-766)
- 11:00AM *Quantum Walks with Decoherence on the N-Cycle.* Preliminary report.  
(646) *Chaobin Liu\** and *Nelson Petulante*, Bowie State University (1056-81-968)
- 11:15AM *Computing a Penalized Maximum Quasi-Likelihood Estimator of the Diffusion Coefficient.*  
(647) *Jeff Hamrick\**, Rhodes College, *Yifei Huang*, *Kostas Kardaras* and *Murad S Taqqu*, Boston University (1056-62-1452)
- 11:30AM *Underrecording in Domestic Violence Data Using Count Data Regression Models.*  
► (648) *Mavis Pararai*, Indiana University of Pennsylvania (1056-62-1848)
- 11:45AM *Statistical Sampling in High Dimensional Inverse Problems.*  
(649) *Jean Marie Linhart\** and *Wolfgang Bangerth*, Texas A&M University (1056-62-1851)

### AMS-ASL-MAA Panel Discussion

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- 10:00 AM – NOON Room 3003, 3rd Floor, Moscone
- Hilbert's Tenth Problem.*  
Organizers: **Jeremy Avigad**, Carnegie Mellon University  
**Penelope Maddy**, University of California Irvine  
**Charles Steinhorn**, Vassar College

### AWM Emmy Noether Lecture

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- 10:05 AM – 10:55 AM Main Lecture Room, 2nd Floor, Moscone
- (650) *You can't hear the shape of a manifold.*  
**Carolyn S. Gordon**, Dartmouth College (1056-58-49)

### MAA Minicourse #1: Part A

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- 10:30 AM – 12:30 PM Pacific H,  
Marriott San Francisco
- Remodeling data analysis.*  
Organizers: **Daniel Kaplan**, Macalester College  
**Vittorio Addona**, Macalester College

### MAA Minicourse #5: Part A

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- 10:30 AM – 12:30 PM Pacific I,  
Marriott San Francisco
- Active learning approaches for the foundational mathematics for elementary teachers courses.*  
Organizers: **Laurie J. Burton**, Western Oregon University  
**Cheryl Beaver**, Western Oregon University  
**Klay Thomas Kruczak**, Western Oregon University

### SIGMAA Officers Meeting

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- 10:30 AM – NOON Room 3014, 3rd Floor, Moscone

### MAA-YMN Panel Discussion

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- 10:40 AM – NOON Room 3006, 3rd Floor, Moscone
- Graduate school: Choosing one, getting in, staying in.*  
Organizers: **Kristi Meyer**, Wisconsin Lutheran College  
**Aaron Luttmann**, Clarkson University  
Panelists: **Richard McGehee**, University of Minnesota  
**Scott A. Lambert**, Colby College

## Thursday, January 14 - Program of the Sessions

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### **MAA Workshop**

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10:40 AM - NOON      Room 3004, 3rd Floor, Moscone

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

Organizers: **Dennis E. Davenport**,  
NSF/DUE  
**Daniel P. Maki**, NSF/DUE  
**Lee L. Zia**, NSF/DUE

### **SIAM Invited Address**

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11:10 AM - NOON

Main Lecture Room,  
2nd Floor, Moscone

- (651) *Optimization Inside: The use of mathematical methods in business processes.*  
**Brenda Dietrich**, IBM (1056-90-33)

### **AMS Colloquium Lectures: Lecture II**

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1:00 PM - 2:00 PM

Main Lecture Room,  
2nd Floor, Moscone

- (652) *Alternating permutations.*  
**Richard P. Stanley**, M.I.T. (1056-05-17)

### **AMS Special Session on Nonlinear Hyperbolic Equations and Control Systems in Physics and Engineering, I**

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1:00 PM - 3:50 PM

Room 2000,  
2nd Floor, Moscone

Organizers: **Petronela Radu**, University of Nebraska-Lincoln  
**Daniel Toundykov**, University of Nebraska-Lincoln

- 1:00PM (653) *Well-posedness of weak and strong solutions in nonlinear flow of gas and structure interactions.*  
**Irena Lasiecka**, University of Virginia (1056-35-960)  
1:30PM (654) *Boundary regularity for Maxwell's equation with applications to shape optimization.*  
**Matthias Eller**, Georgetown University (1056-35-640)  
2:00PM (655) *Stability and stabilization of a multilayer beam system.*  
**Scott W. Hansen**, Iowa State University (1056-93-675)  
2:30PM (656) *Bolza boundary control problem for a fluid-structure interaction model.*  
**Irena Lasiecka**, University of Virginia, and **Amjad Tuffaha\***, University of Southern California (1056-35-1327)  
3:00PM (657)  *$L^1$  Well Posedness of Euler Equations With Dynamic Phase Boundaries.*  
**Chunguang Chen\*** and **Harumi Hattori**, West Virginia University (1056-35-403)

- 3:30PM (658) *Boundary stabilization of nonlinear structural acoustic interactions with interface on a Reissner-Mindlin plate.*  
**George Avalos** and **Daniel Toundykov\***, University of Nebraska-Lincoln (1056-35-1089)

### **AMS Special Session on Degenerate and Singular Elliptic Partial Differential Equations, II**

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1:00 PM - 3:50 PM

Room 3016,  
3rd Floor, Moscone

Organizers: **Marian Bocea**, North Dakota State University  
**Cristina Popovici**, North Dakota State University

- 1:00PM (659)  *$\Delta_\infty$  is well defined - a new proof.*  
**Robert R Jensen**, Loyola University Chicago (1056-35-837)  
1:30PM (660) *Studying the infinity Laplace equation via a finite difference approximation.*  
**Scott N Armstrong**, Louisiana State University (1056-35-1575)  
2:00PM (661) *Numerical methods for the infinity Laplace equation.*  
**Charles K Smart**, University of California, Berkeley (1056-35-1626)  
2:30PM (662) *A remark on  $C^2$  infinity harmonic functions.*  
**Yifeng Yu**, University of California at Irvine (1056-35-2005)  
3:00PM (663) *Limits as  $p(x) \rightarrow \infty$  of  $p(x)$ -harmonic functions.*  
**Jose Miguel Urbano**, University of Coimbra (1056-35-1228)  
3:30PM (664) *Homogenization in  $L^\infty$ . Preliminary report.*  
**Changyou Wang**, University of Kentucky (1056-35-1031)

### **AMS Special Session on Graph Algebras in Analysis and Algebra, II**

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1:00 PM - 3:50 PM

Room 3007,  
3rd Floor, Moscone

Organizers: **Gene Abrams**, University of Colorado at Colorado Springs  
**Mark Tomforde**, University of Houston

- 1:00PM ▶ (665) *Structure theory for  $k$ -graph  $C^*$ -algebras.*  
**Aidan Sims**, University of Wollongong (1056-46-515)  
2:00PM (666) *Desingularization technique for higher-rank graphs.*  
**Cynthia Farthing**, Creighton University (1056-46-911)

## Program of the Sessions – Thursday, January 14 (cont'd.)

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- 2:30PM (667) *Labeled Graph  $C^*$ -algebras with Group Actions.*  
**Teresa Bates**, University of New South Wales, **David Pask**, University of Wollongong, and **Paulette N. Willis\***, The University of Iowa (1056-47-1062)
- 3:00PM ▶ (668) *The role of the socle in the classification of Leavitt path algebras.*  
**Mercedes Siles Molina**, University of Málaga (Spain) (1056-16-1023)
- 3:30PM (669) *Weakly regular and self-injective Leavitt path algebras.*  
**Gonzalo Aranda Pino\***, University of Málaga, Spain, **Kulumani Rangaswamy**, University of Colorado at Colorado Springs, and **Mercedes Siles Molina**, University of Málaga, Spain (1056-16-339)

### AMS Special Session on Algebraic Methods in Signal Processing, II

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- 1:00 PM – 3:40 PM Room 2008,  
2nd Floor, Moscone
- Organizers: **Shamgar Gurevich**, University of California Berkeley  
**Ronny Hadani**, University of Chicago  
**Olga Holtz**, University of California Berkeley and Technical University Berlin  
**Oded Schwartz**, Technical University Berlin  
**Nir Sochen**, Tel Aviv University
- 1:00PM (670) *Algebraic Constructions for Communication Sequences.*  
**Solomon W Golomb**, University of Southern California (1056-00-1867)
- 1:30PM (671) *Multilinear Algebra in Signal Processing.*  
**Lek-Heng Lim**, University of California, Berkeley (1056-15-1823)
- 2:00PM (672) *Group representation patterns in digital signal processing.*  
**Ronny Hadani\***, Utexas at Austin, **Shamgar Gurevich**, IAS, and **Nir Sochen** (1056-42-1758)
- 2:30PM ▶ (673) *Spectral Methods and Semidefinite Programming for Cryo-EM, NMR Spectroscopy, Low-Rank Matrix Completion and Computer Vision.*  
**Amit Singer**, Princeton University and PACM (1056-00-1037)
- 3:00PM ▶ (674) *Group theoretical aspects of Gabor Analysis.* Preliminary report.  
**Hans G. Feichtinger**, University of Vienna (1056-43-1059)

### AMS Special Session on Representation Theory and Nonassociative Algebras, I

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- 1:00 PM – 4:20 PM Room 3011,  
3rd Floor, Moscone
- Organizer: **Andrew Douglas**, City University of New York
- 1:00PM ▶ (675) *The quasi-jordan algebras.* Preliminary report.  
**Raul Felipe**, CIMAT (1056-17-672)
- 1:30PM ▶ (676) *Special identities for quasi-Jordan algebras.*  
**Murray R Bremner\***, University of Saskatchewan, Canada, and **Luiz A Peresi**, University of Sao Paulo, Brazil (1056-17-229)
- 2:00PM (677) *Lie-Yamaguti algebras and related structures.* Preliminary report.  
**Pilar Benito**, Universidad de La Rioja (1056-17-1147)
- 2:30PM (678) *Locally Nilpotency in Commutative Right Nilalgebras.*  
**Alicia Labra**, Universidad de Chile (1056-17-489)
- 3:00PM ▶ (679) *Special Bol Identities.* Preliminary report.  
**Murray Bremner**, University of Saskatchewan, **Ivan Correa**, Universidad Metropolitana de Santiago, Chile, **Irvin Hentzel\***, Iowa State University, and **Luiz Peresi**, Universidade de Sao Paulo, Brazil (1056-17-1172)
- 3:30PM (680) *Gradings on exceptional Lie superalgebras.*  
**Cristina Draper\***, Universidad de Málaga (Spain), **Alberto Elduque**, Universidad de Zaragoza (Spain), and **Cándido Martín**, Universidad de Málaga (Spain) (1056-17-1130)
- 4:00PM (681) *Group gradings on Lie algebras in positive characteristic.*  
**Mikhail V Kotchetov**, Memorial University of Newfoundland (1056-17-1333)

### AMS Special Session on Use of Technology in Modern Complex Analysis Research, I

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- 1:00 PM – 3:50 PM Room 2012,  
2nd Floor, Moscone
- Organizers: **Beth Schaubroeck**, U.S. Air Force Academy  
**Michael Dorff**, Brigham Young University  
**James Rolf**, U.S. Air Force Academy
- 1:00PM ▶ (682) *Applets to Explore Research Topics in Complex Variables.* Preliminary report.  
**James S Rolf\***, United States Air Force Academy, and **Michael Dorff**, Brigham Young University (1056-30-1625)

## **Thursday, January 14 – Program of the Sessions**

- (683) *Research in Complex Dynamics using Java Applets.*  
**Rich L Stankewitz**, Ball State University (1056-30-1048)
  - (684) *Julia Sets and Graphing Iterates of Quadratic Polynomials.* Preliminary report.  
**Julia A Barnes\***, Western Carolina University, **Clinton Curry**, Stony Brook University, and **Beth Schaubroeck**, U. S. Air Force Academy (1056-37-1685)
  - (685) *Modeling Fluid Flow in the Complex Plane.*  
**Michael A. Brilleslyper**, U. S. Air Force Academy (1056-30-1352)
  - (686) *Experimental Complex Function Theory via Circle Packing.* Preliminary report.  
**Ken Stephenson**, University of Tennessee, Knoxville (1056-30-1968)
  - (687) *Use of computer technology for insight and proof.*  
**Roger W. Barnard**, Texas Tech University. (1056-30-810)

## **AMS Special Session on Voting Theory, II**

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|-------------------|--|
| 1:00 PM – 3:50 PM | Room 2010,<br>2nd Floor, Moscone   |
|                   | Organizers: <b>Michael Jones</b> ,<br>Mathematical Reviews   |
|                   | <b>Brian Hopkins</b> , Saint Peter's<br>College  |
|                   | <b>Tommy Ratliff</b> , Wheaton<br>College  |
| 1:00PM<br>► (688) | <i>On the ordinal equivalence of power<br/>indices.</i><br><b>Josep Freixas*</b> , Xavier Molinero,<br>Montserrat Pons, Technical University of<br>Catalonia (Campus Manresa), and<br><b>Dorota Marciniak</b> , Polish Academy of<br>Sciences and National Institute of<br>Telecommunications (1056-91-1202) |
| 1:30PM<br>► (689) | <i>A Smallest Tournament Not Realizable by<br/> <math>\frac{2}{3}</math>-Majority Voting, and Some Open<br/>Problems in Spatial Voting Theory.</i><br><b>Craig A. Tovey*</b> , Georgia Institute of<br>Technology, and <b>Dylan Shepardson</b> , Mt.<br>Holyoke College (1056-91-2025)                       |
| 2:00PM<br>(690)   | <i>The agreement number of tree societies.</i><br><b>Sarah Fletcher</b> , Georgia Institute of<br>Technology, <b>Christopher S. Hardin</b> ,<br>Union College, and <b>Francis Edward Su*</b> ,<br>Harvey Mudd College (1056-52-1416)   |
| 2:30PM<br>(691)   | <i>Selecting Diverse Committees.</i><br><b>Thomas C. Ratliff*</b> , Wheaton College,<br>and <b>Donald G. Saari</b> , University of<br>California, Irvine (1056-91-1533)  |
| 3:00PM<br>► (692) | <i>Approval Balloting for Multi-Winner<br/>Elections.</i><br><b>D. Marc Kilgour</b> , Wilfrid Laurier<br>University (1056-91-710)  |
| 3:30PM<br>(693)   | <i>Satisfaction Approval Voting.</i><br><b>Steven J. Brams*</b> , New York University,<br>and <b>D. Marc Kilgour</b> , Wilfrid Laurier<br>University (1056-91-752)   |

## **AMS Special Session on Analysis and Control Under Uncertainty, II**

**1:00 PM - 3:20 PM**      **Room 2006,  
2nd Floor, Moscone**

Organizers: **Xiaoming Wang**, Florida State University

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|-----------------|--|
| 1:00PM<br>(694) | <i>Balancing a dissipative linear SDE with uncertain parameters.</i><br><b>Sundeep Samson*</b> and James A Renike, Clemson University (1056-90-597)  |
| 1:30PM<br>(695) | <i>Frequency-Domain Criteria for Robust Stability for a Class of Linear Time-Periodic Systems.</i><br><b>Dmitry Altshuller</b> , Crane Aerospace & Electronics (1056-34-720)   |
| 2:00PM<br>(696) | <i>Coderivatives in Parametric Optimization in Asplund Spaces.</i><br><b>Yen-Nhi Nguyen-thi*</b> , <b>Boris Mordukhovich</b> , Wayne State University, and <b>Nam Mau Nguyen</b> , The University of Texas-Pan American (1056-49-1335) |
| 2:30PM<br>(697) | <i>Weighted Composition Operators on Bergman Spaces in the Unit Ball.</i><br><b>Waleed Khaled Al-Rawashdeh</b> , Central Michigan University (1056-47-1417)  |
| 3:00PM<br>(698) | <i>Gibbs measure and the quantization dimension function.</i><br><b>Mrinal Kanti Roychowdhury</b> , The University of Texas-Pan American (1056-37-656)   |

## **AMS Special Session on Applications of Time Scales to Biology, Economics, and Engineering, II**

**1:00 PM - 4:20 PM**      **Room 2004,  
2nd Floor, Moscone**

Organizers: **Martin Bohner**, Missouri  
University of Science and  
Technology

- 1:00PM (699) *Lyapunov-Based Methods for Designing Stable Switched Systems.* Preliminary report.  
**John M Davis**, Baylor University (1056-93-1258)

1:30PM (700) *An exploration of the numerical approximations of dynamic derivatives for adaptive computations.* Preliminary report.  
**Qin Sheng\*** and **Anzhong Wang**, Baylor University (1056-65-545)

## Program of the Sessions – Thursday, January 14 (cont'd.)

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- 2:00PM ► (701) *Global Stability of Complex-Valued Neural Networks on Time Scales.*  
**Suman Sanyal**, Marshall University (1056-60-1167)
- 2:30PM (702) *Linear and nonlinear cobweb models on time scales.*  
**Julius Heim\*** and **Martin Bohner**, Missouri University of Science and Technology (1056-00-1928)
- 3:00PM (703) *Probability on time scales.*  
**Thomas Matthews\*** and **Dr. Martin J. Bohner**, Missouri University of Science and Technology (1056-00-1370)
- 3:30PM ► (704) *Asymptotic Behavior of Linear Dynamic Systems on Time Scales.* Preliminary report.  
**Gro Hovhannisyan**, Kent State University (1056-34-405)
- 4:00PM ► (705) *On second order nonoscillatory scalar linear dynamic equations on time scales.* Preliminary report.  
**Sigrun Bodine\***, University of Puget Sound, and **D.A. Lutz**, San Diego State University (1056-34-1721)

### AMS Special Session on Arithmetic Geometry, II

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- 1:00 PM – 3:50 PM Room 3005,  
3rd Floor, Moscone
- Organizers: **Bo-Hae Im**, Chung-Ang University  
**Jennifer Johnson-Leung**, University of Idaho  
**Jennifer Paulhus**, Kansas State University
- 1:00PM (706) *Non-optimal levels of reducible two-dimensional mod  $\ell$  representations of the Galois group of  $\mathbb{Q}$ .*  
**Kenneth A. Ribet**, University of California, Berkeley (1056-11-1219)
- 1:30PM (707) *Reduction of crystalline representations and generalized Serre weights.*  
**Hui June Zhu**, SUNY at Buffalo (1056-11-1237)
- 2:00PM (708) *Mod 7 and 7-adic Galois representations of elliptic curves.*  
**Ralph Greenberg**, University of Washington, **Karl Rubin** and **Alice Silverberg\***, University of California, Irvine (1056-11-1004)
- 2:30PM (709) *A formula for the special  $L$ -value of a modular abelian variety.*  
**Amod Agashe**, Florida State University (1056-11-1109)
- 3:00PM (710) *Siegel modular forms of degree two attached to Hilbert modular forms.*  
**Jennifer Johnson-Leung\*** and **Brooks Roberts**, University of Idaho (1056-11-1111)
- 3:30PM (711) *The Gauss higher relative class number problem.*  
**John Voight**, University of Vermont (1056-11-346)

### MAA-AMS-MER Invited Paper Session on Mathematics and Education Reform, I: Guided Discovery Learning

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- 1:00 PM – 3:50 PM Room 3008,  
3rd Floor, Moscone
- Organizers: **William H. Barker**, Bowdoin College  
**William G. McCallum**, University of Arizona  
**Bonnie S. Saunders**, University of Illinois at Chicago  
**Michael Starbird**, University of Texas at Austin
- 1:00PM ► (712) *The Power of Guided Discovery Analysis.* Preliminary report.  
**William Barker**, Bowdoin College (1056-BC-1121)
- 1:30PM (713) *Guided Discovery: Matters Mathematical and Beyond.* Preliminary report.  
**Michael Starbird**, The University of Texas at Austin (1056-BC-1250)
- 2:00PM (714) *The Development of Pedagogical Content Knowledge about Early Algebra: A Comparative Study.* Preliminary report.  
**Bill Jacob\***, **Sarah Hough**, **Kyunghee Moon** and **Monica Guzman**, University of California, Santa Barbara (1056-BC-1427)
- 2:30PM ► (715) *A comparison of Inquiry-Based Learning at the Undergraduate and Secondary Levels.* Preliminary report.  
**Stephanie R Nichols**, Washington-Lee High School; Arlington, VA (1056-BC-1693)
- 3:00PM ► (716) *Inquiry Based Learning at Chicago.* Preliminary report.  
**Paul J Sally**, University of Chicago (1056-BC-826)
- 3:30PM ► (717) *Panel Session: Guided Discovery Learning.* Preliminary report.  
**Michael Starbird\***, The University of Texas at Austin, and **William Barker**, Bowdoin College (1056-BC-1356)

### MAA Minicourse #2: Part A

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- 1:00 PM – 3:00 PM Pacific H, Marriott San Francisco
- Using GeoGebra to create activities and applets for visualization and exploration.*  
Organizer: **Michael K. May**, Saint Louis University

### MAA Minicourse #9: Part A

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- 1:00 PM – 3:00 PM Pacific I, Marriott San Francisco
- Getting students involved in undergraduate research.*  
Organizers: **Aparna W. Higgins**, University of Dayton

## **Thursday, January 14 – Program of the Sessions**

**Joseph A. Gallian,**  
University of Minnesota  
Duluth

AMS Session on Number Theory, II

1:00 PM - 3:55 PM		Room 2007, 2nd Floor, Moscone
1:00PM (718)	<i>Solutions to <math>xyz = x + y + z = 1</math> in algebraic integers of bounded degrees.</i> Preliminary report. <b>Helen G Grundman</b> , Bryn Mawr College (1056-11-823)	
1:15PM ► (719)	<i>An elementary Proof of a Ramanujan's Congruence Identity.</i> <b>Syrous Marivani</b> , LSUA (1056-11-844)	
1:30PM ► (720)	<i>Explicit construction of integral bases of radical function fields.</i> <b>Qingquan Wu*</b> and <b>Renate Scheidler</b> , University of Calgary (1056-11-858)	
1:45PM (721)	<i>Flat Cyclotomic Polynomials: A New Approach.</i> <b>Sam Elder</b> , California Institute of Technology (1056-11-936)	
2:00PM (722)	<i>Bounds on the order function of certain <math>p</math>-adic numbers.</i> <b>Brian C. Dietel</b> , Oregon State University (1056-11-939)	
2:15PM	Break	
2:30PM ► (723)	<i>The number of nonzero binomial coefficients modulo <math>p^\alpha</math>.</i> <b>Eric S. Rowland</b> , Tulane University (1056-11-956)	
2:45PM (724)	<i>On the density of discriminants of abelian extensions of a number field.</i> <b>Behailu Mammo</b> , Hofstra University (1056-11-1035)	
3:00PM ► (725)	<i>The Erdos-Moser equation <math>1^n + 2^n + \dots + (m-1)^n = m^n</math>, related congruences, and primary pseudoperfect numbers.</i> <b>Jonathan Sondow*</b> , New York, NY, and <b>Kieren MacMillan</b> , Toronto, Ontario (1056-11-1047)	
3:15PM (726)	<i>Prime Tuples.</i> <b>David C. Torney</b> , Round Ideas Institute (1056-11-1056)	
3:30PM (727)	<i>On the Structure of Witt-Burnside rings over pro-<math>p</math> groups.</i> <b>Lance Edward Miller</b> , University of Connecticut (1056-11-1154)	
3:45PM (728)	<i>Tetranomial Thue Equations.</i> Preliminary report. <b>Daniel P. Wisniewski</b> , Bryn Mawr College (1056-11-1169)	

*AMS Session on Biomathematics, II*

**1:00 PM - 4:10 PM**      **Room 3012,  
3rd Floor, Moscone**

- 1:00PM (729) *Synchronous versus Asynchronous Oscillations for an Antigenically Varying Plasmodium falciparum Infection with Host Immune Response.* Preliminary report.  
**Jonathan L Mitchell**, Southern Methodist University (1056-92-1215)

1:15PM (730) *Evolutionary dynamics on undirected graphs - the effect of graph structure and initial placement on mutant spread.*  
**Jan Rychtar**, University of North Carolina at Greensboro (1056-92-1240)

1:30PM (731) *Combining immunological and epidemiological models.* Preliminary report.  
**Laurentiu Mircea Siga\***, Purdue University, and **Fabio Augusto Milner**, Arizona State University (1056-92-1295)

1:45PM (732) *Outbreak control through voluntary first-order and second-order ring vaccination.* Preliminary report.  
**Michel Tchuenche\***, University of Guelph, **A.P. Galvani**, Yale University School of Medicine, **L. Ancel-Meyers**, The University of Texas at Austin, and **Chris Bauch**, University of Guelph (1056-92-1411)

2:00PM (733) *A moment closure method for stochastic biochemical networks.*  
**Chang Hyeong Lee**, Ulsan National Institute of Science and Technology (UNIST) (1056-92-1412)

2:15PM (734) *Simulation of flagellar motion near a rigid surface.*  
**Ricardo Ortiz\***, Center for Computational Science at Tulane University, and **Ricardo Cortez**, Tulane University (1056-76-1493)

2:30PM (735) *A Statistical Method for Environmental Prediction in Metagenomic Samples.* Preliminary report.  
**Katherine Isaacs**, San Jose State University (1056-92-1415)

2:45PM (736) *Estimating Vital Coral Population Parameters.* Preliminary report.  
**Kristie Llera\***, Florida Institute of Technology, and **Elif Demirci**, University of Ankara (1056-92-1567)

3:00PM (737) *A Systems Biology Approach to Modeling Alzheimer's Disease.* Preliminary report.  
**Christina Rose Kyrtos\***, Fischel Dept. of Bioengineering, University of Maryland, and **John S Baras**, A James Clark School of Engineering, University of Maryland (1056-92-1570)

## **Program of the Sessions – Thursday, January 14 (cont'd.)**

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- 3:15PM ► (738) *Development of a Model of Erythropoiesis in Patients with Chronic Kidney Disease.* **Karen Bliss\***, H T Tran, North Carolina State University, H T Banks, North Carolina State University, and Peter Kotanko, Renal Research Institute, New York (1056-92-1583)
- 3:30PM ► (739) *Asymptotic formulas for the equilibria in a model of suppression of pest resistance to insecticidal genetically modified crops.* **Prasanth George**, Michigan Technological University, and John Ringland\*, University at Buffalo (1056-92-1649)
- 3:45PM ► (740) *Biological Neural Networks on Nvidia Cuda Graphics Processors.* Preliminary report. **Joseph A. Rhoads\***, Florida State University, **Richard Bertram**, Florida State University, **Joel Tabak**, Florida State University, Department of Biology, **Michael Mascagni**, Florida State University, Department of Computer Science, and **Gordon Erlebacher**, Florida State University, Department of Scientific Computing (1056-92-1667)
- 4:00PM (741) *An integrated muscle mechanic-fluid dynamic model of lamprey swimming.* **Chia Yu Hsu\***, Center for Computational Science, Dept. of Math. Tulane University, **Eric Tytell**, Dept. of Biology, Univ. of Maryland, College Park, and **Lisa Fauci**, Tulane University (1056-76-1105)
- 2:00PM (746) *The 2D Boussinesq Equations with vertical viscosity and vertical diffusivity.* Preliminary report. **Dhanapati Adhikari\***, Oklahoma State University, **Chongsheng Cao**, Florida International University, and **Jiahong Wu**, Oklahoma State University (1056-35-1390)
- 2:15PM (747) *Optimality Conditions for Control Systems of Neutral Type.* **Lianwen Wang**, University of Central Missouri (1056-93-1006)
- 2:30PM (748) *Mechanisms of the Instabilities of Ideal Diffusion Flames.* **Joseph E Hibdon, Jr\***, Northwestern University, and **Moshe Matalon**, University of Illinois Urbana-Champaign (1056-35-1442)
- 2:45PM ► (749) *An Analytical and Numerical Study of Optical Soliton Propagation through Photorefractive Media governed by Logarithmic Law Nonlinearity.* **Dawn A. Lott\***, Delaware State University, **Auris Henriquez-Fernandez**, University of Puerto Rico, Rio Piedras, PR, **Bryan Moore**, Michigan State University, **Benjamin Sturdevant**, University of Wisconsin, Madison, and **Anjan Biswas**, Delaware State University (1056-35-1559)
- 3:00PM ► (750) *On the solution of the coupled Navier-Stokes and Darcy equations.* **Prince Chidyagwai\*** and **Beatrice Riviere**, Rice University (1056-35-1576)

### **AMS Session on Differential and Difference Equations, II**

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- 1:00 PM – 4:10 PM Room 3018,  
3rd Floor, Moscone
- 1:00PM (742) *On the symmetry and existence of solutions of some floating drop problems.* **Ray Treinen**, Kansas State University (1056-35-1233)
- 1:15PM (743) *Scattering Due to a Medium Density Change.* Preliminary report. **Nezam Iraniparast**, Western Kentucky University (1056-35-1300)
- 1:30PM (744) *Fundamental solutions of the wave equation in the Einstein-de Sitter spacetime.* **Anahit Galstyan\***, University of Texas-Pan American, **Tamotu Kinoshita**, University of Tsukuba, Tsukuba, Japan, and **Karen Yagdjian**, University of Texas-Pan American (1056-35-1337)
- 1:45PM (745) *Corrector analysis for homogenization of stationary linear transport equations in random media.* **Guillaume Bal** and **Wenjia Jing\***, Columbia University (1056-35-1388)
- 3:15PM (751) *Sub-Wavelength Plasmonic Crystals: Dispersion Relations and Effective Properties.* **Santiago P. Fortes\***, **Robert P. Lipton** and **Stephen P. Shipman**, Louisiana State University (1056-35-1579)
- 3:30PM (752) *Multiple positive solutions for a class of  $p$ - $q$ -Laplacian systems with multiple parameters and combined nonlinear effects.* **Jaffar Ali\***, Florida Gulf Coast University, and **Ratnasingham Shivaji**, Mississippi State University (1056-35-1615)
- 3:45PM (753) *The blowup for the semilinear Klein-Gordon equation in de Sitter spacetime.* **Karen Yagdjian**, University of Texas-Pan American (1056-35-1628)
- 4:00PM (754) *Lyapunov Functionals vs Lyapunov Functions in Stability Analysis for Stochastic Parabolic Differential Equations of Ito Type.* Preliminary report. **J Mahmoud Anabtawi**, American University of Sharjah (1056-35-1681)

## Thursday, January 14 - Program of the Sessions

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### **AMS Session on Computational Mathematics, I**

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**1:00 PM - 4:10 PM**                   **Room 3010,  
3rd Floor, Moscone**

- 1:00PM (755) *Numerical techniques for 3-D Vortex Rings Motion and Collision.*  
**Leon Kaganovskiy\***, New College of Florida, **Robert Krasny**, University of Michigan, Ann Arbor, and **Feng Hualong**, Nanjing University of Science and Technology (1056-65-30)
- 1:15PM (756) *Local Numerical Representation of Algebraic Sets.*  
**Yun Guan\*** and **Jan Verschelde**, University of Illinois at Chicago (1056-65-123)
- 1:30PM ► (757) *Chemotaxis and Numerical Methods for Chemotaxis Models.*  
**Yekaterina Epshteyn**, Carnegie Mellon University (1056-65-151)
- 1:45PM (758) *A stability study of a new explicit numerical scheme for a system of differential equations with a large skew-symmetric component.*  
**Katharine F. Gurski\***, Howard University, and **Stephen O'Sullivan**, Dublin City University (1056-65-504)
- 2:00PM (759) *C<sup>0</sup> interior penalty methods for fully nonlinear Monge-Ampère type equations.*  
**Michael Joseph Neilan\***, **Susanne C. Brenner**, **Thirupathi Gudi** and **Li-yeng Sung**, Louisiana State University (1056-65-518)
- 2:15PM ► (760) *On the convergence of a generalized modified Newton scheme.* Preliminary report.  
**Livinus U Uko**, Johnson C. Smith University (1056-65-1280)
- 2:30PM (761) *On the Convergence of Fully-discrete High-Resolution Schemes with van Leer's flux limiter for Conservation laws.* Preliminary report.  
**Nan Jiang**, University of South Dakota (1056-65-554)
- 2:45PM ► (762) *The Domain Decomposition Method Applied to Hyperbolic Network Problems.*  
**James B Collins**, North Carolina State University (1056-65-796)
- 3:00PM (763) *Kernel Based Function Approximation in High Dimensions.*  
**Fred J. Hickernell**, Illinois Institute of Technology (1056-65-845)
- 3:15PM (764) *Analysis and simulation of a multiphysics and a multiphase problem.*  
**Aycil Cesmelioglu**, Rice University (1056-65-925)
- 3:30PM (765) *Retrieving Economic Parameters in Asset-Flow Equations.*  
**Marlene Willie-Aymone Ouayoro**, George Mason University (1056-65-951)

- 3:45PM ► (766) *A comparison of algorithms for subset selection.* Preliminary report.  
**Martin Brown\***, University of California - Berkeley, **Mary Broadbent**, Amherst College, and **Kevin Penner**, University of Pittsburgh (1056-65-986)

- 4:00PM (767) *A High Accuracy Algorithm for 3D Periodic Electromagnetic Scattering.*  
**Michael J Nicholas**, Tulane University (1056-78-1760)

### **AMS Session on Fields and Commutative Algebra**

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**1:00 PM - 4:10 PM**                   **Room 3022,  
3rd Floor, Moscone**

- 1:00PM (768) *On the Irreducibility of Cauchy-Mirimanoff Polynomials.* Preliminary report.  
**Brian C Irick**, University of Tennessee (1056-12-271)
- 1:15PM (769) *Forcing the appearance of Galois groups: new automatic realization results for p-groups.*  
**Andrew C Schultz**, University of Illinois, Urbana-Champaign (1056-12-850)
- 1:30PM (770) *Observations on Primitive, Normal, and Subnormal Elements of Field Extensions.*  
**Steven H. Weintraub**, Lehigh Univ. (1056-12-257)
- 1:45PM (771) *Prime Ideals in Birational Extensions of Two-Dimensional Power Series Rings.*  
**Christina Eubanks-Turner\***, University of Louisiana at Lafayette, **Melissa Luckas**, Madison, Wisconsin, and **Serpil Saydam**, University of Louisiana at Monroe (1056-13-370)
- 2:00PM ► (772) *Irreducible Divisor Graphs.* Preliminary report.  
**M Axtell**, University of Saint Thomas, **N Baeth\***, University of Central Missouri, and **J Stickles**, Millikin University (1056-13-655)
- 2:15PM (773) *Abstract Factorization into Relatively Prime Elements.* Preliminary report.  
**Jeremiah N. Reinkoester**, University of Iowa (1056-13-896)
- 2:30PM (774) *Krull dimension of a power series ring over a one-dimensional nondiscrete valuation domain.* Preliminary report.  
**Byung Gyun Kang\*** and **Toan**, POSTECH (1056-13-1515)
- 2:45PM (775) *A general theory of almost splitting sets.*  
**Byung Gyun Kang** and **Jung Wook Lim\***, POSTECH (1056-13-1522)
- 3:00PM (776) *The Linear Strand of Path Ideals of Trees.* Preliminary report.  
**Rachelle R. Bouchat\***, Slippery Rock University, **Tài Hà** and **Augustine O'Keefe**, Tulane University (1056-13-1730)

## Program of the Sessions – Thursday, January 14 (cont'd.)

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<p>3:15PM (777) <i>Comparing the Sizes of the Lower Bass Numbers of a Cohen Macaulay Local Ring.</i> Preliminary report.  <b>Jared L Painter</b>, University of Texas at Arlington (1056-13-1830)</p> <p>3:30PM (778) <i>Characterizing rings which admit non-trivial totally reflexive modules.</i> Preliminary report.  <b>Kristen A Beck</b>, The University of Texas at Arlington (1056-13-1984)</p> <p>3:45PM (779) <i>Building Indecomposable Modules.</i> Preliminary report.  <b>Andrew Crabbe</b>, Syracuse University (1056-13-2054)</p> <p>4:00PM ► (780) <i>On the Integral Closure of an Antimatter Domain.</i>  <b>William Travis Trentham</b>, North Dakota State University (1056-13-1857)</p>	<p>3:15PM (790) <i>Oriented Incidence and a Generalization of Hypergraphs.</i>  <b>Lucas J. Rusnak</b>, Binghamton University (1056-05-1465)</p> <p>3:30PM ► (791) <i>Irreducible No-Hole <math>L(2,1)</math> labelings of some classes of graphs.</i>  <b>Jobby Jacob*</b>, Rochester Institute of Technology, and <b>Renu Laskar</b>, Clemson University (1056-05-1466)</p> <p>3:45PM (792) <i>A Parallel Algorithm for finding Maximum Critical Independent Sets in Graphs.</i>  <b>Ermelinda Delavina</b>, University of Houston-Downtown, and <b>Craig Eric Larson*</b>, Virginia Commonwealth University (1056-05-1774)</p>
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### AMS Session on Discrete Mathematics, III

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1:00 PM – 3:55 PM	Room 3020, 3rd Floor, Moscone
1:00PM ► (781) <i>Enumeration Of Bipartite Graphs.</i> <b>Shanzen Gao</b> , Florida Atlantic University (1056-05-715)	
1:15PM (782) <i>Graphs in which each independent dominating set intersects each minimum dominating set.</i> <b>David R. Prier*</b> and <b>Peter D. Johnson</b> , Auburn University (1056-05-706)	
1:30PM ► (783) <i><math>C_4</math>-Factorizations with Two Associate Classes.</i> <b>Chris Rodger</b> and <b>Michael Tiemeyer*</b> , Auburn University (1056-05-629)	
1:45PM ► (784) <i>Deletion relations of graphs.</i> Preliminary report. <b>Stephen G Hartke</b> , University of Nebraska-Lincoln, <b>Hannah Kolb</b> , Illinois Institute of Technology, <b>Jared Nishikawa</b> , Willamette University, and <b>Derrick Stolee*</b> , University of Nebraska-Lincoln (1056-05-498)	
2:00PM (785) <i>Star-Avoiding Ramsey Numbers.</i> <b>Jonelle Hook</b> , Lehigh University (1056-05-485)	
2:15PM (786) <i>p-Capacity <math>\mathbb{Z}^n</math> and Zeta function.</i> <b>Lucio M.G Prado</b> , BMCC - The City University of New York (1056-31-1798)	
2:30PM ► (787) <i>Promotion acting on Standard Young Tableaux of staircase shape.</i> Preliminary report. <b>Qiang Wang*</b> and <b>Steven Pon</b> , UC Davis (1056-05-2141)	
2:45PM ► (788) <i>On extremal cycle-free subgraphs of the hypercube.</i> <b>Lale Özkahya</b> , University of Illinois at Urbana-Champaign (1056-05-838)	
3:00PM (789) <i>Group Colorability of Graphs.</i> <b>Hao Li</b> , West Virginia University (1056-05-898)	

### MAA Session on Developmental Mathematics Education: Helping Under-Prepared Students Transition to College-Level Mathematics, II

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1:00 PM – 4:15 PM	Room 2020, 2nd Floor, Moscone
	Organizers: <b>Kimberly J. Presser</b> , Shippensburg University <b>J. Winston Crawley</b> , Shippensburg University
1:00PM ► (793) <i>Transition Mathematics: A Professional Learning Community Approach.</i> <b>Stuart Boersma*</b> and <b>Aaron Montgomery</b> , Central Washington University (1056-D1-567)	
1:20PM ► (794) <i>How ideas from therapy can help developmental mathematics students with anxiety, motivation, and performance: Successes from two pilot tests.</i> Preliminary report. <b>K. Scott Alberts*</b> , Truman State University, and <b>Jane Roads</b> , Moberly Area Community College (1056-D1-602)	
1:40PM ► (795) <i>An alternative to intermediate algebra for liberal arts majors.</i> Preliminary report. <b>Jeffery D. Sykes</b> , Ouachita Baptist University (1056-D1-941)	
2:00PM ► (796) <i>Preparing students for Elementary Statistics or Math for Liberal Arts.</i> Preliminary report. <b>Mary R Parker</b> , Austin Community College (1056-D1-1821)	
2:20PM ► (797) <i>A successful model for teaching developmental math at CSU-Monterey bay.</i> <b>Lipika Deka</b> , California State University, Monterey Bay (1056-D1-1332)	
2:40PM ► (798) <i>Blending Inquiry-Based Class Sessions with Computer-Assisted Instruction.</i> Preliminary report. <b>William O. Bond*</b> and <b>John C. Mayer</b> , University of Alabama at Birmingham (1056-D1-1778)	

## **Thursday, January 14 – Program of the Sessions**

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| <p>3:00PM<br/>► (799) <i>The Quantitative Learning Center at UConn, and the effects of online homework in the study habits of students.</i> Preliminary report.<br/><b>Álvaro Lozano-Robledo*</b> and <b>Tom Roby</b>, University of Connecticut - Storrs (1056-D1-1150)</p> <p>3:20PM<br/>► (800) <i>Developmental Mathematics Program Assessment: A Case Study.</i> Preliminary report.<br/><b>Frank Anthony Cerreto</b>, The Richard Stockton College of NJ (1056-D1-1321)</p> <p>3:40PM<br/>► (801) <i>Proportional Reasoning Models in Developmental Mathematics Education: Enhancing Under-Prepared Students' Transition at the College-Level.</i> Preliminary report.<br/><b>Jack A Carter*</b>, California State University East Bay, <b>Beverly J Ferrucci</b>, Keene State College, and <b>Ngan Hoe Lee</b>, National Institute of Education, Singapore (1056-D1-224)</p> <p>4:00PM<br/>► (802) <i>Transitions: Helping Under-Prepared Students Find Success at Dominican University.</i><br/><b>Paul R. Coe</b>, Dominican University (1056-D1-2061)</p> | <p>3:00PM<br/>(809) <i>A New Course for Liberal Arts Math: the Mathematics of Calendars and Timekeeping.</i><br/><b>Daniel E. Otero</b>, Xavier University (1056-J1-830)</p> <p>3:20PM<br/>(810) <i>Mathematical ways of reasoning and knowing through geometry.</i><br/><b>James Morrow</b>, Mount Holyoke College (1056-J1-174)</p> <p>3:40PM<br/>► (811) <i>Fun Projects and Activities for Poets and Mathematicians Alike.</i><br/><b>Ioana Mihaila</b>, Cal Poly Pomona (1056-J1-946)</p> |
| <b><i>MAA Session on Online Homework—Innovation and Assessment, I</i></b>   |  |
| 1:00 PM – 4:15 PM   | Room 2009<br>2nd Floor, Moscone  |

## **MAA Session on Mathematics Courses for the Liberal Arts Students. II**

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|                   |   | Room 2024,<br>2nd Floor, Moscone         |
|                   | Organizer:  | <b>Reva Kasman</b> , Salem State College |
| 1:00PM<br>► (803) | <i>Your Financial Future.</i><br><b>Yu-Ju Kuo</b> , Indiana University of Pennsylvania (1056-J1-816)  |  |
| 1:20PM<br>(804)   | <i>Games and Critical Thinking.</i><br><b>Volker Ecke*</b> , <b>Christine von Renesse</b> , <b>Julian Fleron</b> and <b>Philip Hotchkiss</b> , Westfield State College (1056-J1-1866) |  |
| 1:40PM<br>► (805) | <i>Teaching Non-Mathematics Majors using 'Group Topic Books'.</i> Preliminary report.<br><b>Caroline P Lubert</b> , James Madison University (1056-J1-1034)                           |  |
| 2:00PM<br>► (806) | <i>Quantitative Approaches to Problems in Democracy.</i><br><b>Karen Saxe</b> , Macalester College (1056-J1-247)  |  |
| 2:20PM<br>(807)   | <i>Symmetry and Design Portfolios</i><br><i>Showcase Mathematics for Liberal Arts Students.</i><br><b>Penny H. Dunham</b> , Muhlenberg College (1056-J1-391)                          |  |
| 2:40PM<br>► (808) | <i>Service-based learning projects in statistics courses.</i><br><b>Brad Bailey*</b> and <b>A. Robb Sinn</b> , North Georgia College & State University (1056-J1-736)                 |  |

## **MAA Session on Online Homework—Innovation and Assessment, I**

Organizers: **Michael E. Gage**, University  
of Rochester

**Arnold K. Pizer, University**

of Rochester  
**Vicki Roth**, University of  
Rochester

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| 1:00PM<br>► (812) | <i>An Interactive Approach to Discrete Math Using WebWork and Flash Applets.</i><br>Preliminary report.<br><b>Nathan M. Wodarz</b> , University of Wisconsin - Stevens Point (1056-M1-35)         |
| 1:20PM<br>► (813) | <i>Using WebWork, A Web-Based Homework Delivery And Grading System, To Help Prepare Students For Peer Instruction.</i><br><b>Adam R. Lucas</b> , Saint Mary's College of California (1056-M1-228) |
| 1:40PM<br>► (814) | <i>Geometry on a wiki.</i> Preliminary report.<br><b>Michael E McDaniel</b> , Aquinas College (1056-M1-267)   |
| 2:00PM<br>► (815) | <i>The relationship between online homework, test grades, and persistence in calculus.</i><br><b>H Smith Risser</b> , Montana Tech (1056-M1-298)  |
| 2:20PM<br>► (816) | <i>The Effect of an Online Homework System on Student Outcomes in a First Year Mathematics Course.</i><br><b>Laurie Lenz</b> , Marymount University (1056-M1-324)                                 |
| 2:40PM<br>► (817) | <i>WebAssign: "It's How Math Homework is Done!".</i> Preliminary report.<br><b>Denise J LeGrand</b> , University of Arkansas at Little Rock (1056-M1-367)   |
| 3:00PM<br>► (818) | <i>Communicating through Online Assessment.</i> Preliminary report.<br><b>Edward D Smith</b> , Pima Community College (1056-M1-539)   |
| 3:20PM<br>► (819) | <i>Embedding applets into WebWork questions.</i> Preliminary report.<br><b>Michael E. Gage</b> , University of Rochester (1056-M1-585)  |
| 3:40PM<br>► (820) | <i>The Impact of Implementing Web Homework in Calculus II.</i><br><b>P. Gavin LaRose</b> , University of Michigan (1056-M1-703)   |

## **Program of the Sessions – Thursday, January 14 (cont'd.)**

- (821) *A Successful Approach in Designing Online Courses for Freshman Mathematics Courses. Preliminary report.*  
**A. Serpil Saydam\*, A. Dale Magoun and Charlotte H. Owens, University of Louisiana at Monroe (1056-M1-832)**

## ***MAA Session on Preparing K-12 Teachers to Teach Algebra, II***

**1:00 PM - 3:55 PM**      **Room 3002,  
3rd Floor, Moscone**

Organizers: **Elizabeth Burroughs**,  
Montana State University  
**Angela M. Hodge**, North  
Dakota State University  
**William G. McCallum**,  
University of Arizona

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| 1:00PM<br>► (822) | <i>An algebra course for middle school teachers.</i><br><b>Ji Li*</b> and <b>Virginia Bohme</b> , The University of Arizona (1056-N1-1338)  |
| 1:20PM<br>► (823) | <i>Visualizing Algebraic Relationships: Solving Combined Rate Problems with Pattern Blocks.</i> Preliminary report.<br><b>Dianna Spence*</b> and <b>A. Robb Sinn</b> , North Georgia College & State University (1056-N1-865)   |
| 1:40PM<br>► (824) | <i>Inquiry as an Outcome of Algebra.</i> Preliminary report.<br><b>David Fowler</b> , University of Nebraska-Lincoln (1056-N1-803)  |
| 2:00PM<br>(825)   | <i>Big Ideas in Algebra: Materials to Foster Mathematical Thinking.</i><br><b>Carol E Seaman*</b> , University of North Carolina Greensboro, and <b>Jennifer Earles Szydlik</b> , University of Wisconsin Oshkosh (1056-N1-481) |
| 2:20PM<br>► (826) | <i>Calculus: A Gateway to Algebra?!</i> Preliminary report.<br><b>Steve Benson</b> , Lesley University (1056-N1-478)  |
| 2:40PM<br>► (827) | <i>Using modified materials from The Algebra Project with pre-service K-8 mathematics teachers.</i> Preliminary report.<br><b>Steve Blair</b> , Eastern Michigan University (1056-N1-383)                                       |
| 3:00PM<br>► (828) | <i>Teachers, Mathematicians, and Educators Making Sense of Algebra Content.</i><br><b>Joshua D Chesler</b> , California State University, Long Beach (1056-N1-954)  |
| 3:20PM<br>► (829) | <i>Bridging Proportional Reasoning and Algebraic Reasoning: A Focus on Co-variation and Invariance Using Contextualized Problems.</i><br><b>Kien H. Lim</b> , University of Texas at El Paso (1056-N1-242)                      |
| 3:40PM<br>► (830) | <i>Algebra for Algebra Teachers.</i> Preliminary report.<br><b>Ira J Papick*</b> and <b>Jim Lewis</b> , University of Nebraska-Lincoln (1056-N1-36)   |

## ***MAA Session on How Assessment Results Changed Our Program***

**1:00 PM - 3:35 PM**      **Room 2011,  
2nd Floor, Moscone**

Organizers: **Dick Jardine**, Keene State College

**Barbara Edwards, Oregon  
State University**

- (831) ***Faculty Development Through Assessment.*** Preliminary report.  
**Dick Jardine**, Keene State College  
(1056-F1-1175)

► (832) ***Assessment of Mathematical Reasoning Courses for Business Students and Liberal Arts Students.***  
**Vesna Kilibarda**, Indiana University Northwest (1056-F1-557)

► (833) ***Assessing Critical Thinking Throughout the Mathematics Curriculum.*** Preliminary report.  
**Miriam Harris-Botzum**, Lehigh Carbon Community College (1056-F1-1308)

► (834) ***Readiness Assessment and Course Placement through Introductory Calculus.***  
**Alison Ahlgren\***, University of Illinois, and **Marc Harper**, UCLA (1056-F1-1349)

► (835) ***Assessment: If It Ain't Useful, Don't Do It.*** Preliminary report.  
**J. Winston Crawley**, Shippensburg University of Pennsylvania (1056-F1-1033)

► (836) ***Using a knowledge survey for course and program level assessment in mathematics.***  
**Jacqueline M Dewar**, Loyola Marymount University (1056-F1-443)

► (837) ***An Assessment Loop (or How I Learned to Stop Worrying and love the Rubric).*** Preliminary report.  
**Jenn D Berg**, Fitchburg State College (1056-F1-900)

► (838) ***The Impact of Pair Quizzes on Mathematics Achievement and Mathematics Attitude.***  
**Harrison W. Straley\*** and **Lauren Dupee**, Wheaton College (1056-F1-637)

## ***MAA Session on Wavelets in Undergraduate Education***

**1:00 PM - 4:15 PM**      **Room 2022,  
2nd Floor, Moscone**

Organizers: **Caroline Haddad**, SUNY Geneseo

## **Catherine Beneteau, University of South Florida**

**David Ruch**, Metropolitan State College of Denver

**Patrick Van Fleet**, University  
of St. Thomas

## **Thursday, January 14 – Program of the Sessions**

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| <p><b>1:00PM<br/>(839)</b> <i>Teaching a Wavelets Course at a Liberal Arts College.</i></p> <p><b>Beth M. Campbell Hetrick</b>, Gettysburg College (1056-S1-1998)</p> <p><b>1:20PM<br/>► (840)</b> <i>Teaching a Wavelets course in May term.</i></p> <p><b>Janine Wittwer</b>, Westminster College, UT (1056-S1-231)</p> <p><b>1:40PM<br/>► (841)</b> <i>Portable Haar Wavelet Projects with MATLAB.</i> Preliminary report.</p> <p><b>Phil Gustafson</b>, Mesa State College (1056-S1-1334)</p> <p><b>2:00PM<br/>► (842)</b> <i>A Wavelet-Based Unsupervised Learning Algorithm to Cluster Diabetes Based on Continuous Glucose Monitoring Data.</i> Preliminary report.</p> <p><b>Edward Aboufadel*</b>, Grand Valley State University, <b>Robert Castellano</b>, Stony Brook University, and <b>Derek Olson</b>, Drake University (1056-S1-528)</p> <p><b>2:20PM<br/>► (843)</b> <i>Authentication Using Wavelets, part I.</i></p> <p><b>Jill E. Guerra*</b>, University of Arkansas - Fort Smith, <b>John C. Merkel, III</b>, Morehouse College, <b>Eric A. Bickerton</b>, University of Arkansas - Fort Smith, and <b>Warren Chancellor</b>, Morehouse College (1056-S1-1263)</p> <p><b>2:40PM<br/>► (844)</b> <i>Authentication Using Wavelets, part II.</i></p> <p><b>John C. Merkel, III*</b>, Morehouse College, <b>Jill E. Guerra</b>, University of Arkansas - Fort Smith, <b>Warren Chancellor</b>, Morehouse College, and <b>Eric A. Bickerton</b>, University of Arkansas - Fort Smith (1056-S1-1270)</p> <p><b>3:00PM<br/>(845)</b> <i>A Module for the Construction of Scaling Functions using the Cascade Algorithm.</i></p> <p><b>John A Rock*</b>, California State University, Stanislaus, <b>David Ruch</b>, Metropolitan State College of Denver, <b>Kenneth Hoover</b>, California State University, Stanislaus, <b>Helmut Knaust</b>, University of Texas, El Paso, and <b>Roger Zarnowski</b>, Angelo State University (1056-S1-1479)</p> <p><b>3:20PM<br/>► (846)</b> <i>Fourier Series and the Discrete Wavelet Transformation.</i> Preliminary report.</p> <p><b>Patrick J Van Fleet</b>, University of St. Thomas (1056-S1-1535)</p> <p><b>3:40PM<br/>► (847)</b> <i>Wavelet Packets and Image Compression.</i> Preliminary report.</p> <p><b>Cristen M Bonz</b> and <b>Elizabeth A Motz*</b>, University of St Thomas (1056-S1-1691)</p> <p><b>4:00PM<br/>► (848)</b> <i>A Sufficient Condition for the Optimality of Huffman Encoding.</i> Preliminary report.</p> <p><b>William David Hall*</b>, California State University, Stanislaus, and <b>Jonathan Brown</b>, California State University, Stanislaus (1056-S1-1784)</p> | <p><b>Daniel J. Curtin</b>, Northern Kentucky University</p> <p><b>1:00PM<br/>(849)</b> <i>Mathematics and the Internet: The Impact of New Media on a Discipline.</i> Preliminary report.</p> <p><b>Samuel M Hansen</b>, University of Nevada Las Vegas (1056-Z1-1205)</p> <p><b>1:15PM<br/>► (850)</b> <i>Utilizing Web-based Statistical Resources in Teaching Nontraditional Undergraduate Students in Online Learning Environments.</i></p> <p><b>Michael D. Miner</b>, American Public University System (1056-Z1-1898)</p> <p><b>1:30PM<br/>► (851)</b> <i>What can your students do with an iPhone or iPod Touch in Math Class?</i></p> <p><b>Erick B Hofacker</b>, University of Wisconsin - River Falls (1056-Z1-1976)</p> <p><b>1:45PM<br/>(852)</b> <i>Using Wikis to Enhance Mathematical Communication and Develop Students' Investment in Mathematical Community.</i> Preliminary report.</p> <p><b>Donna LaLonde</b> and <b>Jennifer D. Wagner*</b>, Washburn University (1056-Z1-707)</p> <p><b>2:00PM<br/>(853)</b> <i>The Use of Spreadsheets to Illustrate Statistical and Mathematical Concepts.</i></p> <p><b>Morteza Shafii-Mousavi*</b> and <b>Kochanowski Paul</b>, Indiana University South Bend (1056-Z1-86)</p> <p><b>2:15PM<br/>► (854)</b> <i>Impact of Technology on Mathematics Teaching.</i></p> <p><b>Mohammad Khadivi</b>, Jackson State University (1056-Z1-967)</p> <p><b>2:30PM<br/>► (855)</b> <i>Fun and Motivational Activities for Exam Review Day.</i></p> <p><b>Min-Lin Lo</b>, California State University San Bernardino (1056-Z1-676)</p> <p><b>2:45PM<br/>► (856)</b> <i>Euler-Cauchy Using Undetermined Coefficients.</i></p> <p><b>Doreen De Leon</b>, California State University, Fresno (1056-Z1-542)</p> <p><b>3:00PM<br/>► (857)</b> <i>Visualization Projects in Multivariable Calculus.</i></p> <p><b>Jason J Moliterno</b>, Sacred Heart University (1056-Z1-541)</p> <p><b>3:15PM<br/>(858)</b> <i>Using an Opening Quiz to set the Tone for a College Algebra Course.</i></p> <p><b>Gerald Agbegha*</b> and <b>Nailong Guo</b>, Johnson C. Smith University (1056-Z1-1876)</p> <p><b>3:30PM<br/>(859)</b> <i>Strategies of Designing College Algebra with Modular Approach.</i> Preliminary report.</p> <p><b>A. Serpil Saydam*</b>, <b>A. Dale Magoun</b> and <b>Charlotte H. Owens</b>, University of Louisiana at Monroe (1056-Z1-834)</p> <p><b>3:45PM<br/>(860)</b> <i>Issues and Obstacles in Preparing Mathematics Graduate Students for Teaching.</i></p> <p><b>Mary Beisiegel</b>, Western Oregon University (1056-Z1-1768)</p> <p><b>4:00PM<br/>► (861)</b> <i>FUNC! - A Mathematical Card Game.</i></p> <p><b>Mairead K Greene*</b> and <b>Paula Shorter</b>, Rockhurst University (1056-Z1-2034)</p> |
| <b>MAA Session on General Contributed Papers, VI</b>   |   |
| <p>1:00 PM – 4:10 PM</p>   | <p>Room 3000,<br/>3rd Floor, Moscone</p>  |
| <p>Organizers: <b>Eric S. Marland</b>, Appalachian State University</p>  |   |

## ***MAA Session on General Contributed Papers, VI***

**1:00 PM - 4:10 PM**      **Room 3000,  
3rd Floor, Moscone**

Organizers: **Eric S. Marland**,  
Appalachian State University

## **Program of the Sessions – Thursday, January 14 (cont'd.)**

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### **SIAM Minisymposium on Mathematics and a Smart Planet**

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1:00 PM – 4:06 PM		Room 2002, 2nd Floor, Moscone
Organizer:	Brenda Dietrich, IBM T. J. Watson Research	
Chair:	Lior Horesh, IBM TJ Watson Research Center	
1:00PM ► (862)	<i>Managing the Earth: Modeling Data into Decisions under Geological and Engineering Uncertainty.</i> Jef Caers, Stanford University (1056-60-804)	
1:39PM (863)	<i>Design in inverse problems.</i> Eldad Haber*, UBC, Lior Horesh, IBM, and Luis Tenorio, Colorado School of Mines (1056-49-2102)	
2:18PM (864)	<i>Inversion - Taking one step backwards.</i> Lior Horesh*, IBM TJ Watson Research Center, Eldad Haber, University of British Columbia, and Luis Tenorio, Colorado School of Mines (1056-49-2148)	
2:57PM (865)	<i>On the probabilistic validation of models for interacting agents.</i> Roger Chanem*, Civil and Environmental Engineering, University of Southern California, and Sonjoy Das, Department of Aerospace and Mechanical Engineering, University of Southern California	
3:36PM (866)	<i>Global optimization with response surfaces for computationally expensive functions with environmental applications.</i> Rommel Regis, St. Joseph's University, Christine Shoemaker*, School of Operations Research and Information Engineering, Cornell University, and Yilun Wang, St. Cornell University	

### **Joint Committee on Women in the Mathematical Sciences Panel Discussion**

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1:00 PM – 2:30 PM		Room 3003, 3rd Floor, Moscone
	<i>Hard problems, approximate solutions: Finding balance between math and family demands.</i>	
Organizer:	Kathleen M. O'Hara, Mathematical Sciences Research Institute	
Panelists:	Mary Ann Mason, University of California, Berkeley Marc Goulden, University of California, Berkeley Carol Hollenshead, University of Michigan Maura B. Mast, University of Massachusetts, Boston Judy L. Walker, University of Nebraska	

### **MAA Committee on Graduate Students-YMN Panel Discussion**

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1:00 PM – 2:20 PM		Room 3006, 3rd Floor, Moscone
	<i>Finding a research topic and thesis advisor.</i>	
Organizers:	David C. Manderscheid, University of Nebraska-Lincoln Aaron Luttmann, Clarkson University	
Panelists:	Raegan J. Higgins, Texas Tech University Franziska Hinckelmann, Virginia Polytechnic Institute and State University Steven G. Krantz, Washington University Jennifer McNulty, University of Montana	

### **SIGMAA on Statistics Education Panel Discussion**

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1:00 PM – 2:20 PM		Room 3004, 3rd Floor, Moscone
	<i>Statistics ≠ mathematics: What a first- (or second-) time teacher of statistics should know.</i>	
Organizer:	Michael A. Posner, Villanova University	
Panelists:	Robin Lock, St. Lawrence University Elaine Newman, Sonoma State University Leigh Lunsford, Longwood University Ken Torre, Cotati-Rohnert Park Unified School District	

### **SIGMAA on Math Circles for Students and Teachers, Part I**

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1:00 PM – 4:15 PM		Pacific J, Marriott San Francisco
		<i>Fostering, supporting, and propagating Math Circles (Part II is Saturday at 1:00 p.m.).</i>
Organizers:	James S. Tanton, St. Mark's Institute of Mathematics Tatiana Shubin, San Jose State University	

### **Summer Program for Women in Mathematics (SPWM) Reunion**

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1:00 PM – 4:00 PM		Room 3014, 3rd Floor, Moscone

## **Thursday, January 14 – Program of the Sessions**

## **AMS Special Session on Arithmetic of Function Fields, II**

**1:30 PM - 4:20 PM**      **Room 3009,  
3rd Floor, Moscone**

Organizers: **Allison Pacelli**, Williams College  
**Michael Rosen**, Brown University

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| 1:30PM<br>(867)   | <i>A Gross-Zagier formula for quaternion algebras over totally real fields.</i><br>Preliminary report.<br><b>Kristin E. Lauter*</b> , Microsoft Research,<br>and <b>Eyal Z. Goren</b> , McGill University<br>(1056-11-1669)   |
| 2:00PM<br>(868)   | <i>An N-point version of the Mason-Stothers abc Theorem.</i><br><b>Robert L. Benedetto</b> , Amherst College<br>(1056-11-659)   |
| 2:30PM<br>(869)   | <i>The Reflection Theorem for class groups of global function fields and its applications.</i><br><b>Yoonjin Lee</b> , Ewha Womans University<br>(1056-11-377)  |
| 3:00PM<br>(870)   | <i>Prime polynomials.</i><br><b>Paul Pollack</b> , University of Illinois at Urbana-Champaign (1056-11-1082)  |
| 3:30PM<br>► (871) | <i>Function Fields with Class Number Indivisible by a Prime <math>\ell</math>.</i><br><b>Michael W Daub*</b> , University of California, Berkeley, <b>Allison Pacelli</b> , Williams College, <b>Michael Rosen</b> , Brown University, <b>Jaclyn Lang</b> , Bryn Mawr College, <b>Mona Merling</b> , Bard College, and <b>Natee Pitiwan</b> , Williams College (1056-11-1110) |
| 4:00PM<br>(872)   | <i>Class numbers of function fields.</i><br>Preliminary report.<br><b>Jing Long Hoelscher</b> , University of Arizona (1056-11-994)   |

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

**2:00 PM - 4:00 PM**      **Room 3001,  
3rd Floor, Moscone**

Organizer: **Jon W. Scott**, Montgomery  
Community College

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| 2:00PM<br>(873) | <i>Lurch: Software for Teaching Mathematical Proof.</i><br><b>Nathan Carter</b> * <sup>†</sup> , Bentley University, and<br><b>Kenneth G. Monks</b> , University of Scranton   |
| 2:00PM<br>(874) | <i>DIYModeling – Do It Yourself Modeling and Simulation for STEM Learning.</i><br><b>Frank Wattenberg</b> * <sup>†</sup> , U. S. Military Academy, <b>William C Bauldry</b> , Appalachian State University, <b>Joe Yanik</b> , Emporia State University, <b>Keith Erickson</b> , Georgia Gwinnett College, and <b>Marion Smith</b> , Texas Southern University |
| 2:00PM<br>(875) | <i>MAA's Online Calculus Text.</i><br><b>Lawrence Moore</b> * <sup>†</sup> and <b>David Smith</b> , Duke University  |

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| 2:00PM<br>(876) | <i>MAA's Mathematical Sciences Digital Library (MathDL).</i><br><b>Lawrence Moore</b> *, Duke University, and <b>Tom Leathrum</b> , Jacksonville State University   |
| 2:00PM<br>(877) | <i>Maplets for Calculus.</i><br><b>Philip B. Yasskin</b> , Texas A&M University, and <b>Douglas B. Meade</b> *, University of South Carolina  |
| 2:00PM<br>(878) | <i>The design of a research based curriculum for real analysis.</i><br><b>Kyeong Hah Roh</b> , Arizona State University   |
| 2:00PM<br>(879) | <i>Research-Based Video for Teaching Undergraduate Proof.</i><br><b>James Sandefur</b> *, Georgetown University, <b>Connie Campbell</b> , Millsaps College, <b>Kay Somers</b> , Moravian College, and <b>Geoffrey Birk</b> , Georgetown University  |
| 2:00PM<br>(880) | <i>WeBWork, a Web-based Interactive Homework System.</i><br><b>Arnold Pizer</b> *, <b>Vicki Roth</b> and <b>Michael Gage</b> , University of Rochester  |
| 2:00PM<br>(881) | <i>Change Agents for Teaching and Learning Statistics (CATALYST).</i><br><b>Joan Garfield</b> *, <b>Bob delMas</b> , <b>Andy Zieffler</b> , University of Minnesota, <b>Allan Rossman</b> , <b>Beth Chance</b> , California Polytechnic State University, San Luis Obispo, <b>George Cobb</b> , Mount Holyoke College, and <b>John Holcomb</b> , Cleveland State University |
| 2:00PM<br>(882) | <i>Multidisciplinary Sustainability Modules: Integrating STEM Courses.</i><br><b>Thomas J. Pfaff</b> *, <b>Ali S. Erkan</b> , <b>Jason G. Hamilton</b> and <b>Michael Rogers</b> , Ithaca College   |
| 2:00PM<br>(883) | <i>CCLI2: Colorado Momentum.</i><br><b>Mary Nelson</b> *, <b>Harvey Segur</b> , <b>Anne Dougherty</b> and <b>James Curry</b> , University of Colorado, Boulder  |
| 2:00PM<br>(884) | <i>Investigating the Mathematical Biology of Metabolic Scaling using <i>Manduca InStaRs</i> (Interdisciplinary Science Training and Research).</i><br><b>Jennifer Garbett</b> , <b>Judy Holdener</b> *, <b>Chris Gillen</b> , <b>Brad Hartlaub</b> , <b>Harry Itagaki</b> and <b>Drew Kerkhoff</b> , Kenyon College   |
| 2:00PM<br>(885) | <i>STEM Real World Application Modules.</i><br><b>Darren Narayan</b> *, <b>William Basener</b> , <b>Matthew Coppenbarger</b> , <b>Paul Tymann</b> and <b>Moises Sudit</b> , Rochester Institute of Technology   |
| 2:00PM<br>(886) | <i>Paradigms in Physics: Multiple Entry Points.</i><br><b>Tevian Dray</b> *, <b>Corinne A Manogue</b> , <b>Barbara Edwards</b> , <b>David McIntyre</b> and <b>Emily van Zee</b> , Oregon State University   |

## Program of the Sessions – Thursday, January 14 (cont'd.)

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2:00PM (887)	<i>Quantitative Reasoning in the Contemporary World (QRCW).</i> <b>Bernard L. Madison</b> , University of Arkansas, <b>Stuart Boersma</b> , Central Washington University, <b>Caren L. Diefenderfer*</b> , Hollins University, and <b>Shannon W. Dingman</b> , University of Arkansas	2:00PM (897)	<i>Development and Dissemination of Computational Science Educational Materials and Curricula at the Undergraduate Level.</i> <b>Paula Federico*</b> , <b>Terry Lahm</b> , <b>Andrea Karkowski</b> , Capital University, <b>Sheryl Hemkin</b> , Kenyon College, <b>Gerald Mueller</b> , Columbus State Community College, and <b>Ignatios Vakalis</b> , California State Polytechnic Institute
2:00PM (888)	<i>College Ready in Mathematics and Physics Partnership.</i> <b>Gay Stewart</b> , <b>Bernard L. Madison*</b> , <b>Shannon W. Dingman</b> , University of Arkansas, <b>Pete Joenks</b> , Springdale High School, and <b>John Jones</b> , University of Arkansas, Fort Smith	2:00PM (898)	<i>Learning Discrete Mathematics and Computer Science via Primary Historical Sources.</i> <b>Jerry Lodder*</b> , <b>David Pengelley</b> and <b>Guram Bezhanishvili</b> , New Mexico State University
2:00PM (889)	<i>Undergraduate Biology and Mathematics Training Program at NJIT: The effect of neuronal morphology on passive properties of neurons.</i> <b>Farzan Nadim*</b> , <b>Krutanjali Shah</b> , <b>Yamin Noor</b> and <b>A. Farzad Sheibani</b> , New Jersey Institute of Technology	2:00PM (899)	<i>MBUR (Mathematical Biology &amp; Undergraduate Research): Modeling Growth and Biochemical Pathways in Selenite Resistant Bacteria.</i> <b>George Yates*</b> , <b>Jon Caguiat</b> , <b>Carl Sims</b> , <b>Jozsi Jalics</b> and <b>Mark Womble</b> , Youngstown State University
2:00PM (890)	<i>Authentic Discovery Projects for Introductory Statistics.</i> <b>Robb Sinn*</b> , <b>Dianna Spence</b> and <b>Brad Bailey</b> , North Georgia College	2:00PM (900)	<i>SyBR-U: Synthetic Biology Research for Undergraduates.</i> <b>Laurie J. Heyer*</b> , <b>A. Malcolm Campbell</b> , Davidson College, <b>Jeffrey L. Poet</b> and <b>Todd T. Eckdahl</b> , Missouri Western State University
2:00PM (891)	<i>Empowering Student Learning in Mathematical Analysis.</i> <b>Barbara Shipman*</b> and <b>James Epperson</b> , The University of Texas at Arlington	2:00PM (901)	<i>The Center for Women in Mathematics at Smith College.</i> <b>Ruth Haas*</b> and <b>James Henle</b> , Smith College
2:00PM (892)	<i>Modern Biology, Modern Mathematics, and Modern Solutions: Moving Biomathematics Education Beyond Calculus.</i> <b>Raina Robeva*</b> , <b>Robin Davies</b> , Sweet Briar College, <b>Terrell Hodge</b> and <b>Alexander Enyedi</b> , Western Michigan University	2:00PM (902)	<i>Studying Cell Response to Input Signals as the Basis for Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences.</i> <b>Ovidiu Lipan</b> , <b>Kathy Hoke</b> , <b>Lester Caudill, Jr</b> , <b>Laura Runyen-Janecky</b> and <b>Garrett Graham*</b> , University of Richmond
2:00PM (893)	<i>Quantitative Literacy Across the Curriculum in a Liberal Arts Setting.</i> <b>Semra Kilic-Bahri*</b> , <b>Ben Steele</b> and <b>Peter White</b> , Colby-Sawyer College	2:00PM (903)	<i>Research and Education Program in Mathematical and Biological Sciences.</i> <b>Semen Koksal*</b> , <b>Rob van Woesik</b> , <b>Dave Carroll</b> , <b>Richard Sinden</b> , <b>Eugene Dshalalow</b> and <b>Kristie Llera</b> , Florida Institute of Technology
2:00PM (894)	<i>HBCU Retreat and Follow-On Program.</i> <b>Don Small*</b> , United States Military Academy, and <b>Laurette Foster</b> , Prairie View A&M University	2:00PM (904)	<i>Quantitative Skills in Biology through Scientific Inquiry at James Madison University.</i> <b>D. Brian Walton*</b> , <b>Anthony Tongen</b> , <b>Nusrat Jahan</b> and <b>Reid Harris</b> , James Madison University
2:00PM (895)	<i>Explorations in Complex Variables with Accompanying Applets: Undergraduate Research.</i> <b>Michael Dorff*</b> , Brigham Young University, <b>Jim Rolf</b> , U.S. Air Force Academy, <b>Rich Stankewitz</b> , Ball State University, <b>Mike Brilleslyper</b> , <b>Beth Schaubroeck</b> , U.S. Air Force Academy, <b>Jane McDougall</b> , Colorado College, and <b>Ken Stephenson</b> , University of Tennessee	2:00PM (905)	<i>Research and Education in Computational Mathematics for Undergraduates in the Mathematical Sciences at NJIT.</i> <b>Zoi-Heleni Michalopoulou*</b> , <b>Roy Goodman</b> , <b>David Horntrop</b> , <b>Jonathan Luke</b> , <b>Michael Siegel</b> and <b>Yuan-Nan Young</b> , New Jersey Institute of Technology
2:00PM (896)	<i>Mathematical Biology Projects at UNCG.</i> <b>Jan Rychtar*</b> , <b>Maya Chhetri</b> , <b>Mary Crowe</b> , <b>David Remington</b> and <b>Olav Ruepell</b> , The University of North Carolina at Greensboro		

## **Thursday, January 14 – Program of the Sessions**

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| 2:00PM<br>(906) | <i>Interactive Online Modules and Take-Home Assignments for Inquiry-Learning to Provide First-Hand Experience in Matrix Algebra Course.</i><br><b>Hamide Dogan-Dunlap*</b> and <b>Piotr Wojciechowski</b> , University of Texas at El Paso  |
| 2:00PM<br>(907) | <i>Experimental Mathematics.</i><br><b>Marc Chamberland</b> , Grinnell College  |
| 2:00PM<br>(908) | <i>Undergraduate Training in Bioinformatics.</i><br><b>Ming-Ying Leung*</b> , <b>Steve Aley</b> , <b>Vladik Kreinovich</b> and <b>Elizabeth Walsh</b> , The University of Texas at El Paso  |
| 2:00PM<br>(909) | <i>PREP: MAA's Professional Enhancement Program.</i><br><b>J. Michael Pearson</b> , Mathematical Association of America, <b>Nancy Baxter Hastings</b> , Dickinson College, <b>Nathaniel Dean</b> , Texas State University, San Marcos, <b>Virginia Buchanan</b> , Hiram College, and <b>Jon Scott*</b> , Montgomery College |

AMS Invited Address

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| 2:15 PM - 3:05 PM   | Main Lecture Room,<br>2nd Floor, Moscone |
| (910) <i>Laplacians on vector bundles on graphs.</i><br><b>Richard W. Kenyon</b> , Brown University<br>(1056-60-14) |  |

## ***MAA-Project NExT Panel Discussion***



## ***MAA CRAFTY Panel Discussion***



- William E. Haver**, Virginia Commonwealth University  
**William Marion**, Valparaiso University

## **SIGMAA on Statistics Education and SIGMAA on Research in Undergraduate Mathematics Education Panel Discussion**



## ***AMS Committee on the Profession Panel Discussion***

- 2:45 PM - 4:15 PM**      **Room 3003,  
3rd Floor, Moscone**

*What I wish I had known when applying  
for a job.*

Moderator: **Christopher K. McCord,**  
Northern Illinois University

Panelists: **Elizabeth T. Beazley,**  
University of Michigan and  
Williams College

**Julie Bergner,** University of  
California, Riverside

**Karl Kempf,** Intel and  
Arizona State University

**Bryna Kra,** Northwestern  
University

**Ken Ono,** University of  
Wisconsin-Madison

**Tony DeRose,** Pixar  
Animation Studios

*AMS Retiring Presidential Address*

- 3:20 PM - 4:10 PM**      **Main Lecture Room,  
2nd Floor, Moscone**

*Joint Prize Session*

- 4:25 PM – 5:25 PM**      **Main Lecture Room,  
2nd Floor, Moscone**

## **Program of the Sessions – Thursday, January 14 (cont'd.)**

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### **SIGMAA on Environmental Mathematics Guest Lecture**

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**5:30 PM – 6:30 PM** Room 2020,  
**2nd Floor, Moscone**

*Speaker and title to be announced.*

### **Joint Prize Session Reception**

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**5:30 PM – 6:30 PM** Room 2006,  
**2nd Floor, Moscone**

### **SIGMAA on Business, Industry, and Government Guest Lecture**

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**5:45 PM – 6:45 PM** Room 3006,  
**3rd Floor, Moscone**

5:45PM (912) *From Netflix to Gerrymanders: A Sample of BIG Applications of Mathematics.*  
Barry A Cipra, Northfield, MN  
(1056-A0-1541)

### **SIGMAA on Statistics Education Business Meeting and Reception**

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**5:45 PM – 7:15 PM** Room 3002,  
**3rd Floor, Moscone**

### **SIGMAA on Mathematics Instruction Using the Web Reception and Business Meeting**

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**5:45 PM – 6:30 PM** Room 3004,  
**3rd Floor, Moscone**

Presenter: **Bruce W. Yoshiwara**, Pierce  
College

### **MAA Two-Year College Reception**

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**5:45 PM – 7:30 PM** Pacific J, Marriott San Francisco

### **MAA Special Presentation for Students**

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**6:00 PM – 7:00 PM** Room 2022,  
**2nd Floor, Moscone**

6:00PM ► (913) *Low dimensional topology for fun and profit, or, how to extract money from the R4 space.*  
Cliff Stoll, Acme Klein Bottle Company

### **SIGMAA on Research in Undergraduate Mathematics Education Business Meeting**

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**6:00 PM – 7:30 PM** Room 2024,  
**2nd Floor, Moscone**

### **SIGMAA on Environmental Mathematics Business Meeting**

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**6:30 PM – 7:00 PM** Room 2020,  
**2nd Floor, Moscone**

### **SIGMAA on Mathematics Instruction Using the Web Presentation and Discussion**

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**6:30 PM – 7:30 PM** Room 3004,  
**3rd Floor, Moscone**

*Life after Wolfram Alpha.*

Presenter: **Bruce W. Yoshiwara**, Pierce  
College

### **SIGMAA on Mathematics and the Arts Special Presentation**

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**7:00 PM – 9:00 PM** Room 2009,  
**2nd Floor, Moscone**

*Open mike mathematical poetry reading.*  
Organizer: **Douglas Norton**, Villanova  
University

### **SIGMAA on Business, Industry, and Government Reception**

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**7:15 PM – 8:00 PM** Room 3006,  
**3rd Floor, Moscone**

### **Young Mathematicians' Network Open Forum**

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**7:30 PM – 8:30 PM** Sierra C, Marriott San Francisco

## **Friday, January 15**

### **Joint Meetings Registration**

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**7:30 AM – 4:00 PM** First Floor Lobby, Moscone

### **AMS Special Session on Mathematics and Physical Experiment, I**

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**7:30 AM – 10:50 AM** Room 2000,  
**2nd Floor, Moscone**

Organizers: **Roger Thelwell**, James  
Madison University  
**Anthony Tongen**, James  
Madison University  
**Paul Warne**, James Madison  
University

► (914) *Shock Wave Formation on Turbulent  
Coanda Surfaces.*

**Thomas Dowd**, James Madison  
University (1056-76-1537)

► (915) *The Applied Mathematics Laboratory:  
translating what you see into what you  
do.*

**Michael Tabor**, University of Arizona  
(1056-97-1045)

► (916) *GPS Tracking of a Roller Coaster.  
Preliminary report.*

**Michael C. Sostarecz**, Monmouth  
College (1056-00-1096)

## ***Friday, January 15 – Program of the Sessions***

- (917) *Experiments from a Capstone Laboratory at New Jersey Institute of Technology.*  
**Michael Booty**, New Jersey Institute of Technology (1056-00-1733)
  - (918) *Notes from the MEC Lab at the University of Delaware.*  
**John A Pelesko**, University of Delaware (1056-74-699)
  - (919) *Experiments in the Classroom.*  
**Jon Jacobsen**, Harvey Mudd College (1056-37-1030)
  - (920) *Reinventing the Wheel!*  
**Roger Thelwell**, James Madison University (1056-35-1634)

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

- |                    | Room 2024,<br>2nd Floor, Moscone   |
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| Organizers:        | <b>Darren Narayan</b> , Rochester Institute of Technology<br><b>Bernard Brooks</b> , Rochester Institute of Technology<br><b>Jacqueline Jensen</b> , Sam Houston State University<br><b>Carl V. Lutzer</b> , Rochester Institute of Technology<br><b>Vadim Ponomarenko</b> , San Diego State University<br><b>Tamas Wiandt</b> , Rochester Institute of Technology |
| 8:00AM<br>► (921)  | <i>Configurations of extremal type II lattices and codes.</i><br><b>Scott Kominers</b> , Harvard University (1056-06-2154)   |
| 8:30AM<br>► (922)  | <i>Modular forms arising from <math>Q(n)</math> and Dyson's rank.</i><br><b>Maria Monks</b> , Massachusetts Institute of Technology (1056-11-2153)   |
| 9:00AM<br>► (923)  | <i>Efficient simulation of fluid flow.</i><br>Preliminary report.<br><b>David Alexander Hannasch*</b> and <b>Monika Neda</b> , University of Nevada, Las Vegas (1056-65-165)   |
| 9:30AM<br>► (924)  | <i>Image Denoising Via Feature-Based Sparse and Redundant Dictionaries.</i><br>Preliminary report.<br><b>Josh Koslosky*</b> and <b>Stacey Levine</b> , Duquesne University (1056-49-173)   |
| 10:00AM<br>► (925) | <i>Analytic Properties of Unitary Equivalence to Constant Diagonal Matrices.</i> Preliminary report.<br><b>Daniel E Poore</b> , Pomona College (1056-15-185)   |
| 10:30AM<br>► (926) | <i>Complete Growth and Graph Products of Groups.</i><br><b>Daniel Allen</b> , University of Maine at Farmington, <b>Meghan Cream</b> , Wake Forest University, <b>Kate Finlay</b> , Lafayette College, and <b>Ranjan Rohatgi*</b> , Northwestern University (1056-20-274)  |

# **AMS-AWM Special Session on Spectral Problems on Compact Riemannian Manifolds, I**

**8:00 AM - 10:50 AM**      **Room 3014,  
3rd Floor, Moscone**

Organizers: **Carolyn Gordon**, Dartmouth College  
**Ruth Gorbet**, University of Texas at Arlington  
**Craig Sutton**, Dartmouth College

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|------------------|--|
| 8:00AM<br>(927)  | <i>Spectral bounds on 2-orbifold diffeomorphism type.</i><br><b>Emily Proctor</b> , Middlebury College, and <b>Elizabeth Stanhope*</b> , Lewis & Clark College (1056-53-1590)                          |
| 8:30AM<br>(928)  | <i>Spectral and geometric bounds on orbifold homotopy type.</i> Preliminary report.<br><b>Emily Proctor*</b> , Middlebury College, and <b>Elizabeth Stanhope</b> , Lewis & Clark College (1056-58-919) |
| 9:00AM<br>(929)  | <i>Some applications of the trace formula on orbifolds to the inverse spectral problem.</i> Preliminary report.<br><b>Alejandro Uribe</b> , University of Michigan, Ann Arbor (1056-58-1289)           |
| 9:30AM<br>(930)  | <i>On the singularities of the exponential map.</i><br><b>Benjamin Schmidt*</b> , Michigan State University, and <b>Keith Burns</b> , Northwestern University (1056-51-1041)                           |
| 10:00AM<br>(931) | <i>Quantum ergodic restriction theorems.</i><br><b>Steve Zelditch</b> , Johns Hopkins Univ and Northwestern Univ (1056-35-748)   |
| 10:30AM<br>(932) | <i>Spectral rigidity of analytic plane domains with one mirror symmetry.</i><br><b>Hamid Hezari*</b> , MIT, and <b>Steve Zelditch</b> , Johns Hopkins University (1056-35-1012)                        |

## **AMS Special Session on Nonlinear Hyperbolic Equations and Control Systems in Physics and Engineering, II**

**8:00 AM - 10:50 AM**      **Room 2006,  
2nd Floor, Moscone**

Organizers: **Petronela Radu**, University of Nebraska-Lincoln

- 8:00AM (933) *Uniform stabilization of the system of dynamic elasticity by non-linear boundary dissipation.*  
**Roberto Triggiani**, University of Virginia (1056-35-532)

8:30AM (934) *Concerning the Qualitative of a Coupled Fluid-Structure Semigroup.*  
**George Avalos**, University of Nebraska-Lincoln (1056-35-569)

## Program of the Sessions – Friday, January 15 (cont'd.)

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9:00AM (935)	<i>Optimal control of a thermoelastic structural acoustic model.</i> <b>Catherine Lebiedzik</b> , Wayne State University (1056-35-2037)	10:00AM (943)	<i>Modeling the Movements of a Thermoregulating Timber Rattlesnake.</i> Preliminary report. <b>John G. Alford*</b> , Sam Houston State University, and <b>Bill Lutterschmidt</b> , Department of Biological Sciences and Texas Research Institute for Environmental Studies/Sam Houston State University (1056-92-114)
9:30AM (936)	<i>Analysis and Simulation of a One-dimensional Plasma Model.</i> <b>Stephen Pankavich</b> , University of Texas at Arlington (1056-35-560)	10:30AM (944)	<i>Discrete host-parasitoid models with Allee effects and age structure in the host.</i> <b>Sophia R-J Jang</b> , Texas Tech University (1056-92-740)
10:00AM (937)	<i>Existence of time periodic solutions of non-linear wave equations.</i> <b>Jintae Kim</b> , Tuskegee University (1056-35-1631)		
10:30AM (938)	<i>Bridging the asymptotic behavior of solutions to hyperbolic equations with parabolic equations.</i> <b>Petronela Radu*</b> , University of Nebraska-Lincoln, <b>Grozdena Todorova</b> and <b>Borislav Yordanov</b> , University of Tennessee-Knoxville (1056-35-1074)		

### AMS Special Session on Biomathematics: Modeling in Biology, Ecology, and Epidemiology, I

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8:00 AM – 10:50 AM	Room 3007, 3rd Floor, Moscone
	Organizers: <b>Olcay Akman</b> , Illinois State University <b>Linda Allen</b> , Texas Tech University <b>Timothy D. Comar</b> , Benedictine University <b>Sophia Jang</b> , Texas Tech University <b>Lih-Ing Roeger</b> , Texas Tech University
8:00AM (939)	<i>The fundamental bifurcation theorem for Darwinian matrix models.</i> Preliminary report. <b>Jim M. Cushing</b> , University of Arizona (1056-92-603)
8:30AM (940)	<i>Bifurcation analysis of a model for hormonal regulation of the menstrual cycle.</i> <b>James F. Selgrade</b> , North Carolina State University (1056-92-786)
9:00AM (941)	<i>Darwinian Dynamics of Avian Populations with Reproductive Synchrony.</i> Preliminary report. <b>Shandelle M. Henson*</b> , Andrews University, <b>J. M. Cushing</b> , University of Arizona, and <b>James L Hayward</b> , Department of Biology, Andrews University (1056-92-1807)
9:30AM (942)	<i>Competitive Exclusion in a Juvenile-Adult Model with Continuous and Seasonal Reproduction.</i> <b>Azmy S. Ackleh*</b> and <b>Ross A. Chiquet</b> , University of Louisiana at Lafayette (1056-92-1016)

### AMS Special Session on Enumerative Combinatorics, I

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8:00 AM – 10:50 AM	Room 3005, 3rd Floor, Moscone
	Organizers: <b>Brian Miceli</b> , Trinity University <b>Jeff Remmel</b> , University of California San Diego
8:00AM ► (945)	<i>SL<sub>k</sub>-Tilings of Lattices.</i> Preliminary report. <b>Francois Bergeron</b> , Universite du Quebec a Montreal (1056-05-704)
8:30AM (946)	<i>A basis for the coinvariant space for quasisymmetric polynomials.</i> Preliminary report. <b>Sarah K Mason*</b> , UCSD/Wake Forest University, and <b>Aaron Lauve</b> , Texas A&M (1056-05-1361)
9:00AM (947)	<i>Experimental Investigations into the Zeros of Rook Polynomials and Analytic Functions.</i> Preliminary report. <b>Jim Haglund</b> , University of Pennsylvania (1056-05-1586)
9:30AM (948)	<i>A Pieri rule for skew Schur functions.</i> <b>Sami H Assaf*</b> , MIT, and <b>Peter R.W. McNamara</b> , Bucknell University (1056-05-1578)
10:00AM (949)	<i>Some enumerative and order theoretic aspects of the rook monoid.</i> <b>Mahir Bilen Can</b> , Tulane University (1056-05-1371)
10:30AM (950)	<i>Partitions, Orthogonal Polynomials and q-Series.</i> Preliminary report. <b>George E. Andrews</b> , The Pennsylvania State University (1056-05-475)

### AMS Special Session on L-Functions and Analytic Number Theory, I

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8:00 AM – 10:50 AM	Room 3009, 3rd Floor, Moscone
	Organizers: <b>Alina Bucur</b> , Institute for Advanced Study <b>Chantal David</b> , Concordia University <b>Matilde Lalín</b> , University of Alberta

## *Friday, January 15 – Program of the Sessions*

8:00AM (951)	<i>Recent progress on QUE.</i> <b>Soundararajan Kannan</b> , Stanford University (1056-11-1609)
8:30AM (952)	<i>Ranks of Jacobians of modular curves.</i> <b>Kaneenika Sinha</b> , PIMS/Alberta (1056-11-666)
9:00AM (953)	<i>Schur polynomials, metaplectic Whittaker functions and the Yang-Baxter equation.</i> <b>Daniel W Bump</b> , Stanford (1056-11-1403)
9:30AM (954)	<i>Lennon's work on relations between traces of Frobenius and hypergeometric functions.</i> Preliminary report. <b>Ben Brubaker*</b> and <b>Catherine Lennon</b> , MIT (1056-11-1463)
10:00AM (955)	<i>Weyl Group Multiple Dirichlet Series.</i> Preliminary report. <b>Jennifer Beineke</b> , Western New England College, <b>Ben Brubaker</b> , Massachusetts Institute of Technology, and <b>Sharon Frechette*</b> , College of the Holy Cross (1056-11-802)
10:30AM (956)	<i>Explicit Upper Bounds for L-functions on the critical line.</i> <b>Vorrapan Chandee</b> , Stanford University (1056-11-376)

## **AMS Special Session on Representation Theory and Nonassociative Algebras, II**

8:00 AM - 10:50 AM	<b>Room 3011,</b> <b>3rd Floor, Moscone</b>
	<b>Organizer:</b> <b>Andrew Douglas</b> , City University of New York
8:00AM (957)	<i>On coverings of the smallest Paige loop.</i> <b>Stephen M Gagola III</b> , University of Arizona (1056-20-130)
8:30AM (958)	<i>Associative Geometry.</i> <b>Michael Kinyon*</b> , University of Denver, and <b>Wolfgang Bertram</b> , Institut Élie Cartan Nancy (1056-20-1766)
9:00AM (959)	<i>Enveloping algebras of Malcev algebras.</i> <b>Marina Tvalavadze</b> , University of Saskatchewan (1056-17-718)
9:30AM (960)	<i>Equivariant map algebras.</i> <b>Erhard Neher</b> , <b>Alistair Savage*</b> , University of Ottawa, and <b>Prasad Senesi</b> , Catholic University of America (1056-17-415)
10:00AM ► (961)	<i>E8 Theory. Preliminary report.</i> <b>A Garrett Lisi</b> , Makawao, HI (1056-83-1051)
10:30AM (962)	<i>The Structure of E6.</i> <b>Tevian Dray*</b> , Oregon State University, and <b>Aaron Wangberg</b> , Winona State University (1056-17-1224)

**AMS Special Session on Arithmetic and Nonarchimedean Dynamics, III**

8:00 AM - 9:50 AM	Room 2012, 2nd Floor, Moscone
	Organizers: <b>Joseph Silverman</b> , Brown University
	<b>Michelle Manes</b> , University of Hawaii
	<b>Raphael Jones</b> , College of the Holy Cross
8:00AM (963)	<i>Dynamics of <math>f(x) = x+1/x</math> via Elliptic Curves.</i> <b>Jang-Woo Park*</b> and <b>Shuhong Gao</b> , Clemson University (1056-11-1794)
8:30AM (964)	<i>Some fractals associated to K3 surfaces.</i> <b>Arthur Baragar</b> , University of Nevada Las Vegas (1056-11-1751)
9:00AM (965)	<i>Dynamical Mordell-Lang results via Euclidean uniformizations.</i> <b>Thomas Scanlon</b> , University of California, Berkeley (1056-12-841)
9:30AM (966)	<i>Galois theory of quadratic rational functions with a non-trivial automorphism.</i> Preliminary report. <b>Michelle Manes*</b> , University of Hawaii at Manoa, and <b>Rafe Jones</b> , College of the Holy Cross (1056-11-831)

***MAA-AMS-MER Invited Paper Session on  
Mathematics and Education Reform, II:  
Climate, Sustainability, and the Curriculum***

8:00 AM - 10:50 AM	Room 3008, 3rd Floor, Moscone
Organizers:	<b>William H. Barker</b> , Bowdoin College <b>William G. McCallum</b> , University of Arizona <b>Bonnie S. Saunders</b> , University of Illinois at Chicago <b>Mary Lou Zeeman</b> , Bowdoin College <b>Deborah Hughes Hallett</b> , University of Arizona
8:00AM ► (967)	<i>Climate and Sustainability in the Mathematics Curriculum.</i> Preliminary report. <b>Mary Lou Zeeman</b> , Bowdoin College (1056-BC-1444)
8:30AM ► (968)	<i>Climate Change: Impact and Opportunities.</i> <b>Deborah Hughes Hallett</b> , University of Arizona, Harvard Kennedy School (1056-BC-1753)
9:00AM (969)	<i>Mathematics Concepts Needed in the Global Systems Science Course.</i> <b>Alan D Gould</b> , University of California Berkeley - Lawrence Hall of Science (1056-BC-1266)

## Program of the Sessions – Friday, January 15 (cont'd.)

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9:30AM ► (970)	<i>Introducing Students and Teachers to the Connections Between Science and Mathematics using NASA Space Science Discoveries as a Vehicle for Mathematics Education.</i> <b>Sten F Odenwald</b> , Catholic University of America/ADNET/NASA (1056-BC-1251)	8:15AM (979)	<i>Homogenization of The Laplace Equation with Oscillating Stationary Ergodic Free Boundary.</i> Preliminary report. <b>Betul Orcan</b> , University of Texas at Austin (1056-35-1793)
10:00AM ► (971)	<i>How Calculus can Participate in Multidisciplinary Sustainability Modules.</i> Preliminary report. <b>Thomas J Pfaff*</b> , <b>Ali S Erkan</b> , <b>Jason G Hamilton</b> and <b>Michael Rogers</b> , Ithaca College (1056-BC-1314)	8:30AM (980)	<i>Micromirror Method For Catadioptric Sensor Design.</i> <b>Emek Kose Can*</b> , Loyola Marymount University, and <b>Ronald Perline</b> , Drexel University (1056-35-1828)
10:30AM	Audience discussion about the ideas generated in this session on Climate and Sustainability in the Curriculum.	8:45AM (981)	<i>Analysis of nonlinear Darcy-Forchheimer flows in porous media.</i> <b>Adem Cakmak</b> , Ohio University, Lancaster (1056-35-1845)

### MAA Invited Paper Session on The Mathematics of Origami

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8:00 AM – 10:55 AM	Room 3006, 3rd Floor, Moscone		
	Organizers: <b>Tamara Veenstra</b> , University of Redlands <b>Thomas C. Hull</b> , Western New England College		
8:00AM (972)	<i>Paper Folding, Orders of Elements, and Binary Representations of Fractions.</i> <b>Tamara B Veenstra</b> , University of Redlands (1056-BF-1225)	9:15AM ► (983)	<i>Approximating Convection Dominated Diffusion PDEs Using an Adaptively Weighted Least Squares Finite Element Approach.</i> Preliminary report. <b>Myles D Baker*</b> , Baylor University and Wabash College, and <b>Sarah R Farrell</b> , Bard College and Wabash College (1056-35-241)
8:30AM ► (973)	<i>Combinatorial Methods in Flat Origami.</i> <b>Thomas C. Hull</b> , Western New England College (1056-BF-1057)	9:30AM ► (984)	<i>An inverse Sturm-Liouville problem using three spectra.</i> Preliminary report. <b>Mihaila Cristina Drignei</b> , Allegheny College (1056-34-330)
9:00AM (974)	<i>Mathematical Methods in Origami Design.</i> <b>Robert J. Lang</b> , Langorigami.com (1056-BF-1497)	9:45AM (985)	<i>On the existence of a double S-shaped bifurcation curve.</i> <b>Jerome Goddard II*</b> , Mississippi State University, <b>EunKyoung Lee</b> , Pusan National University, and <b>Ratnasingham Shivaji</b> , Mississippi State University (1056-34-350)
9:30AM ► (975)	<i>Bisections, Trisections and Quintisections by Origami.</i> Preliminary report. <b>Roger C. Alperin</b> , San Jose State University (1056-BF-1242)	10:00AM ► (986)	<i>Particular Solution to the Euler-Cauchy Equation: A Novel Approach.</i> Preliminary report. <b>Adnan H Sabuwala</b> , California State University, Fresno (1056-34-388)
10:00AM ► (976)	<i>Rigid origami.</i> <b>Ileana Streinu</b> , Smith College (1056-BF-1996)	10:15AM (987)	<i>Analysis of a Truly Nonlinear Oscillator.</i> <b>Dorian Wilkerson</b> , Clark Atlanta University (1056-34-420)
10:30AM (977)	<i>Computational Origami from Science to Sculpture.</i> <b>Erik D. Demaine*</b> and <b>Martin L. Demaine</b> , Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology (1056-BF-1946)	10:30AM (988)	<i>First Integrals for Systems via Complex Partial Lagrangians.</i> <b>Imran Naeem*</b> , LUMS, Lahore, Pakistan, <b>Fazal Mahomed</b> , University of the Witwatersrand, and <b>R Naz</b> , IIU, Islamabad (1056-34-425)

### AMS Session on Differential and Difference Equations, III

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8:00 AM – 10:55 AM	Room 3018, 3rd Floor, Moscone		
8:00AM (978)	<i>Computation of Green's functions via successive image theory.</i> <b>D. Palaniappan</b> , Texas A&M University (1056-35-1783)	10:45AM (989)	<i>Nonautonomous fractional integrodifferential equations with nonlocal initial conditions.</i> <b>Haewon Lee*</b> and <b>Peter Fempeng-Mireku</b> , Dillard University (1056-35-2032)

## *Friday, January 15 – Program of the Sessions*

**AMS Session on Biomathematics, III**

**8:00 AM - 10:55 AM**      **Room 3020,  
3rd Floor, Moscone**

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| ▶ 8:00AM<br>► (990) | <i>Modeling Stochastic Cardiac Caveolae: a potential source of arrhythmogenic persistent sodium current in cardiomyocytes.</i><br><b>Ian M. Besse*</b> , <b>Colleen C. Mitchell</b> , University of Iowa, <b>Erwin F. Shibata</b> , Molecular Physiology and Biophysics, University of Iowa, and <b>Thomas Hund</b> , Cardiovascular Medicine, University of Iowa (1056-92-1833) |
| 8:15AM<br>(991)     | <i>A Mathematical Model for the MAPK Pathway in Starfish Oocytes. Preliminary report.</i><br><b>Semen Koksal*</b> , <b>Ioana Policeanu</b> and <b>David Carroll</b> , Florida Institute of Technology (1056-92-1844)   |
| 8:30AM<br>► (992)   | <i>A piecewise-defined two-variable model for cardiac tissue.</i><br><b>Lisa Driskell</b> , Purdue University (1056-92-1859)   |
| 8:45AM<br>(993)     | <i>Effect of the Diffusion Coefficient on Noise Sensitivity in the Stochastic Chemostat.</i><br><b>Suzanne Galayda*</b> and <b>Ernest Barany</b> , New Mexico State University (1056-92-1869)  |
| 9:00AM<br>(994)     | <i>Identifying Effective Age-Based Mammogram Screening Schedules Using a Stochastic Population Model of Breast Cancer.</i><br><b>Sarah Geneser*</b> , Stanford University, <b>Stephanie L. Rutledge</b> , San Diego State University Research Foundation, and <b>Sylvia K. Plevritis</b> , Stanford University (1056-92-1899)  |
| 9:15AM              | Break  |
| 9:30AM<br>► (995)   | <i>Poisson Approximations for Palindrome Distributions in DNA Viral Genomes.</i><br><b>Ming-Ying Leung</b> , University of Texas at El Paso (1056-92-1902)   |
| 9:45AM<br>(996)     | <i>On the Expectation and Variance of the Reversal Distance.</i><br><b>Yiting Yang*</b> , University of South Carolina, and <b>Laszlo Szekely</b> , University of South Carolina (1056-92-2146)  |
| 10:00AM<br>(997)    | <i>Predicting Flexibility and Motions of Proteins Using Rigidity.</i><br><b>Adnan Slijoka</b> and <b>Walter Whiteley*</b> , York University (1056-52-51)   |
| 10:15AM<br>(998)    | <i>Fibonacci Hexagon and Genetic Tableau.</i><br><b>Okan Gurel*</b> , IBM, and <b>Demet Gurel</b> , Touro College (1056-54-109)  |
| 10:30AM<br>(999)    | <i>2-D Biharmonic Equation for the Displacement of an Isotropic Kelvin-Voigt Viscoelastic Plate. Preliminary report.</i><br><b>Robert J Ronkese</b> , United States Military Academy at West Point (1056-74-650)   |

10:45AM (1000) *Optimal vaccine distribution in a spatiotemporal epidemic model with an application to rabies and raccoons.*  
**Rachael Miller Neilan\***, Louisiana State University, and **Suzanne Lenhart**, NIMBioS, University of Tennessee  
(1056-93-407)

# **AMS Session on Difference Equations and Time Scales**

- 8:00AM (1001) *Qualitative Behaviour of Dynamic Equations on Time Scales.* Preliminary report.  
**Allan Peterson\*** and **Lynn Erbe**, University of Nebraska-Lincoln (1056-39-372)

8:15AM (1002) *Positive solutions of even order periodic boundary value problems.*  
**Qingkai Kong** and **Min Wang\***, Northern Illinois University (1056-39-390)

8:30AM (1003) *Modeling of Groundwater Level of a Specified Cut Slope.*  
**Adam B Baharum**, **AlQahtani Hessah\***, **Zalila B Ali**, **Habibah B Latih** and **Swee Peng Koay**, Universiti Sains Malaysia (1056-39-398)

8:45AM (1004) *Oscillation and nonoscillation for nonlinear dynamic equations.*  
**Lynn H. Erbe\***, **Allan C. Peterson**, University of Nebraska, Lincoln, and **Baoguo Jia**, Zhongshan University, Guangzhou , China (1056-39-439)

9:00AM (1005) *Some Properties of the Generalized Laplace Transform on Time Scales.*  
**Chris Ahrendt**, University of Nebraska-Lincoln (1056-39-505)

9:15AM Break

9:30AM (1006) *Differential-difference Equations in Entire Functions.*  
**Vadim Tkachenko**, Ben-Gurion University of the Negev, Israel (1056-39-771)

9:45AM (1007) *A model of an SIR disease on time scales.* Preliminary report.  
**Raegan Higgins**, Texas Tech University (1056-39-1322)

10:00AM (1008) *Unitary Operators Associated to Hyperbolic Reflection Groups.* Preliminary report.  
**Mihai Stoiciu\***, Williams College, and **Norbert Peyerimhoff**, Durham University, UK (1056-39-1470)

10:15AM (1009) *Strong Approximation for Markov Modulated Random Sequences with Two-Time Scales.*  
**Son Luu Nguyen\*** and **George Gang Yin**, Wayne State University (1056-60-1123)

## Program of the Sessions – Friday, January 15 (cont'd.)

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### AMS Session on Approximations

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**8:00 AM – 10:55 AM** Room 2007,  
2nd Floor, Moscone

- 8:00AM (1010) *Linear Dependence of Translates.*  
Preliminary report.  
**Ashley N Moses**, Saint Louis University (1056-00-318)
- 8:15AM (1011) *Greedy Approximation with regard to Non-greedy Bases.*  
**Vladimir Temlyakov, Mingrui Yang\***, University of South Carolina, and **Peixin Ye**, Nankai University (1056-41-331)
- 8:30AM (1012) *Ratio Boundary Extension for Empirical Mode Decomposition.*  
**Qin Wu\*** and **Sherman Riemenschneider**, West Virginia University (1056-41-426)
- 8:45AM Break
- 9:00AM (1013) *Extensions of Bernstein's Inequality to Rational Functions.*  
**Mohammed A. Qazi\***, Tuskegee University, and **Q. I. Rahman**, Université de Montréal (1056-41-729)
- 9:15AM (1014) *Cesáro Summability of Expansions in Orthogonal Polynomials on a Cylinder.*  
**Jeremy Wade**, Pittsburg State University (1056-41-812)
- 9:30AM Break
- 9:45AM (1015) *Optimal Learning of Bandlimited Functions from Localized Sampling.*  
**Charles Micchelli**, State University of New York, The University at Albany, **Yuesheng Xu**, Syracuse University, and **Haizhang Zhang\***, University of Michigan (1056-41-926)
- 10:00AM (1016) *The second derivatives of the Chebyshev polynomials as M-matrices.* Preliminary report.  
**Joseph Kolibal**, The University of Southern Mississippi (1056-41-962)
- 10:15AM (1017) *Local Lipschitz Constant for Vector Valued Approximation.* Preliminary report.  
**Mohammad A AlQuudah\*** and **James R Angelos**, Central Michigan University (1056-41-1310)
- 10:30AM (1018) *On Even and Odd Variation-Diminishing Convolution Transforms.*  
**Terence G Hanchin**, Kent State University (1056-41-1903)
- 10:45AM (1019) *Approximation by Bivariate Linear Splines on Triangulations.*  
**Edmond J. Nadler**, Eastern Michigan University (1056-41-2050)

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

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**8:00 AM – 10:55 AM** Room 3016,  
3rd Floor, Moscone

- 8:00AM (1020) *Weak compactness in the space of Operator Valued Measures  $M_{ba}(\Sigma, \mathcal{L}(X, Y))$  with an Application.*  
Preliminary report.  
**NasirUddin Ahmed**, University of Ottawa (1056-46-21)
- 8:15AM (1021) *A Generalized Ston-Wierstrass theorem for Cz-vector lattices and Cz-algebras.*  
Preliminary report.  
**Hueytzen J Wu\***, Texas A & M University - Kingsville, and **Wan-Hong Wu**, UT Health Science Center - San Antonio (1056-46-258)
- 8:30AM (1022) *Path-connectedness of the space of norm-attaining functionals on certain Banach spaces.*  
**Antonia E Cardwell**, Millersville University of Pennsylvania (1056-46-726)
- 8:45AM (1023) *Dominated Ergodic Theorem for isometries of non-commutative  $L_p$ -spaces,  $1 < p < \infty$ .* Preliminary report.  
**Shukhrat M Usmanov**, Ashford University (1056-46-924)
- 9:00AM (1024) *Aperiodicity in Topological k-Graphs.*  
Preliminary report.  
**Sarah E. Wright**, Dartmouth College (1056-47-217)
- 9:15AM (1025) *On real, Jordan and Lie structures in locally  $W^*$ -algebras.*  
**Alexander A. Katz**, St. John's University, NY, **Roman Kushnir** and **Mark Ustavayev\***, University of South Africa, Pretoria, South Africa (1056-46-1032)
- 9:30AM (1026) *Crossed product  $C^*$ -algebras by finite group actions with the projection free tracial Rokhlin property.*  
**Dawn Archey**, Ben Gurion University (1056-46-1211)
- 9:45AM (1027) *Continuous Dependence Results for Ill-posed Evolution Problems in a Banach Space.*  
**Matthew A. Fury**, Bryn Mawr College (1056-46-1261)
- 10:00AM (1028) *Operator spaces with an ideal structure.*  
**Sonia Sharma**, University of Houston (1056-46-1291)
- 10:15AM (1029) *Exponential integrability: a unified approach.*  
**Carlo Morpurgo\***, University of Missouri, Columbia, and **Luigi Fontana**, Universita' di Milano - Bicocca, Italy (1056-46-1302)
- 10:30AM (1030) *On a reduction method for nonassociative  $L_p$ -spaces.*  
**Genady Ya. Grabarnik**, York College, CUNY, **Alexander A. Katz\***, St. John's University, and **Laura Shwartz**, IBM T.J. Watson Research Center, Hawthorne, NY (1056-46-1552)

## *Friday, January 15 – Program of the Sessions*

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| 10:45AM<br>(1031)                                     | <i>Traces of operator derivatives.</i><br>Preliminary report.<br><b>Anna Skripka</b> , Texas A&M University<br>(1056-47-110)   | Raina S. Robeva, Sweet Briar College  |
| <b>AMS Session on Algebraic Geometry</b>              |  |   |
| 8:00 AM - 10:40 AM                                    | Room 3022,<br>3rd Floor, Moscone   |   |
| 8:00AM<br>(1032)                                      | <i>The Converse of Abel's theorem ('polynomial' and 'rational').</i> Preliminary report.<br><b>Veniamin Kisunko</b> , University of Toronto (1056-14-57)   | 8:00AM<br>(1042) <i>Interdisciplinary curricular innovations at the University of the Virgin Islands.</i><br><b>Robert C Stoltz</b> and <b>Camille A. McKayle*</b> , University of the Virgin Islands (1056-Q5-1676)  |
| 8:15AM<br>(1033)                                      | <i>The geometry of multipartite quantum systems.</i><br><b>Carl A. Miller*</b> and <b>Eric Chitambar</b> , University of Michigan, Ann Arbor (1056-14-153)   | 8:20AM<br>(1043) <i>Developing Computational Skills in Biocalculus Courses.</i> Preliminary report.<br><b>Timothy Comar</b> , Benedictine University (1056-Q5-459)  |
| 8:30AM<br>(1034)                                      | <i>Rational Fibrations of <math>\overline{M}_{g,1}</math>.</i><br><b>David Jensen</b> , University of Texas (1056-14-447)  | 8:40AM<br>► (1044) <i>The Growth of Interdisciplinary Math-Biology Courses at James Madison University.</i> Preliminary report.<br><b>D. Brian Walton*</b> , <b>Anthony Tongen</b> , <b>Nusrat Jahan</b> and <b>Reid Harris</b> , James Madison University (1056-Q5-1755) |
| 8:45AM<br>(1035)                                      | <i>Space Curve Singularities and the Semple Tower.</i> Preliminary report.<br><b>Alex L Castro*</b> , <b>Richard Montgomery</b> , UCSC, and <b>Michail Zhitomirskii</b> , Technion - Haifa - IL (1056-14-624)  | 9:00AM<br>► (1045) <i>Introductory Mathematical Biology through Finite Dynamical Systems.</i><br><b>Raina S Robeva*</b> , Sweet Briar College, and <b>Terrell Hodge</b> , Western Michigan University (1056-Q5-1402)  |
| 9:00AM<br>(1036)                                      | <i>GIT Compactification of the Quintic Threefolds.</i><br><b>Chirag M Lakhani</b> , North Carolina State University (1056-14-971)  | 9:20AM<br>► (1046) <i>Research in Mathematical Biology at UNCG.</i><br><b>Jan Rychtar</b> , The University of North Carolina at Greensboro (1056-Q5-1777)   |
| 9:15AM  | Break  | 9:40AM<br>► (1047) <i>UBM Research and Training Activities in BioMath.</i> Preliminary report.<br><b>Semen Koksal</b> , Florida Institute of Technology (1056-Q5-1969)  |
| 9:30AM<br>(1037)                                      | <i>The Laplace transform of the cut-and-join equation and the Bouchard-Marino conjecture on Hurwitz numbers.</i><br><b>Bertrand Eynard</b> , Service de Physique Theorique de Saclay, <b>Motohico Mulase</b> , University of California, Davis, and <b>Brad Safnuk*</b> , Central Michigan University (1056-14-1317) | 10:00AM<br>► (1048) <i>Bio-Surveillance in Undergraduate Mathematics Classroom.</i> Preliminary report.<br><b>Urmie Ghosh-Dastidar</b> , New York City College of Technology, CUNY (1056-Q5-2023)   |
| 9:45AM<br>(1038)                                      | <i>Tensor Product of Picard Stacks.</i><br><b>Ahmet Emin Tatar</b> , Florida State University (1056-14-1473)   | 10:20AM<br>► (1049) <i>Mathematical Biology and Undergraduate Research (MBUR) at Youngstown State University.</i><br><b>George T Yates</b> , Youngstown State University (1056-Q5-1882)   |
| 10:00AM<br>(1039)                                     | <i>Algebraic cycles and degenerations for a class of surfaces of general type.</i><br><b>Christopher Lyons</b> , California Institute of Technology (1056-14-1933)   | 10:40AM<br>► (1050) <i>Viscoelastic Effects in Biological Soft Tissues.</i><br><b>S. Minerva Venuti*</b> and <b>Padmanabhan Seshaiyer</b> , George Mason University (1056-Q5-1530)  |
| 10:15AM<br>► (1040)                                   | <i>Representations of polynomials non-negative on non-compact subsets of <math>\mathbb{R}^2</math>.</i><br><b>Ha N Nguyen*</b> and <b>Victoria Powers</b> , Emory University (1056-12-688)   |   |
| 10:30AM<br>(1041)                                     | <i>Fan Cohomology and Equivariant Chow Rings of Toric Varieties.</i><br><b>Mu-wan Huang</b> , Southwest Minnesota State University (1056-19-1689)  |   |
| <b>MAA Session on General Contributed Papers, VII</b> |  |   |
| 8:00 AM - 10:55 AM                                    | Room 3000,<br>3rd Floor, Moscone   |   |
|   |  | Organizers: <b>Eric S. Marland</b> , Appalachian State University   |
|   |  | <b>Daniel J. Curtin</b> , Northern Kentucky University  |
| 8:00AM<br>► (1051)                                    | <i>The Role of Permutation Matrices in Magic Squares.</i> Preliminary report.<br><b>Peter Staehle</b> and <b>Michael Andrade</b>   |   |

## **MAA Session on Undergraduate Mathematical Biology, I**

- 8:00 AM - 10:55 AM**      **Room 2009,  
2nd Floor, Moscone**

## ***MAA Session on General Contributed Papers, VII***

## **Program of the Sessions – Friday, January 15 (cont'd.)**

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| <p>► 8:30AM (1053) <b>Chess, Church, and Knots: Statistics Through Service and Research.</b><br/><b>Neil Nicholson</b>, William Jewell College (1056-Z1-102)</p> <p>► 8:45AM (1054) <b>Making Sense of Sampling Distributions: Activities for an Introductory Statistics Course.</b> Preliminary report.<br/><b>Kate G McGivney</b>, Shippensburg University (1056-Z1-1697)</p> <p>► 9:00AM (1055) <b>Some Results, Problems and Conjectures On Generalized Markoff Numbers.</b><br/><b>Shanzhen Gao</b>, Florida Atlantic University (1056-Z1-689)</p> <p>► 9:15AM (1056) <b>Effect of noise in Canonical Correlation Analysis with application to Ozone Pollution.</b><br/><b>Katerina G. Tsakiri*</b> and <b>Igor G. Zurbenko</b>, State University of New York at Albany (1056-Z1-683)</p> <p>► 9:30AM (1057) <b>Set Difference and Jump Sequences.</b><br/><b>Chelsea Cerini*</b>, <b>Sommer Sprowls</b> and <b>Roman Wong</b>, Washington &amp; Jefferson College (1056-Z1-484)</p> <p>► 9:45AM (1058) <b>The Mystery of the M&amp;m Sequences.</b><br/><b>Sommer L Sprowls*</b>, <b>Chelsea Cerini</b> and <b>Roman Wong</b>, Washington &amp; Jefferson College (1056-Z1-483)</p> <p>► 10:00AM (1059) <b>What a higher <math>q</math>-skew <math>\tau</math>-derivation can do for you.</b><br/><b>Heidi A. Haynal</b>, Walla Walla University (1056-Z1-294)</p> <p>► 10:15AM (1060) <b>Likelihood Inference for Nonlinear Regression Models.</b><br/><b>Harshini Fernando</b>, Purdue University North Central (1056-Z1-791)</p> <p>► 10:30AM (1061) <b>Trilinable Points of Curves.</b><br/><b>Michael S McClendon*</b> and <b>Charles L Cooper</b>, University of Central Oklahoma (1056-Z1-2088)</p> <p>► 10:45AM (1062) <b>Level curves of the angle function of a positive definite symmetric matrix.</b><br/><b>Neeraj Bajracharya</b>, University of North Texas (1056-Z1-609)</p> | <p>► 8:30AM (1064) <b>Challenging Eurocentric Mathematics History to Encourage Understanding of Cultural Diversity in Mathematics Classrooms.</b><br/><b>Elizabeth C Rogers</b>, Piedmont College (1056-H7-2127)</p> <p>► 9:00AM (1065) <b>Increasing the Participation of Girls in Mathematics and other STEM Fields in Higher Education.</b><br/><b>Tina Alves Mancuso*</b> and <b>Deborah Lawrence</b>, The Sage Colleges (1056-H7-1608)</p> <p>► 9:30AM (1066) <b>From research to mathematics curriculum development: Social Justice for African Americans in Chester Heights.</b><br/><b>Julius Davis</b>, University of Maryland, College Park (1056-H7-1518)</p> <p>► 10:00AM (1067) <b>Algebra Project Curricula - Mathematics meaning through experience and dialogue.</b> Preliminary report.<br/><b>David W. Henderson*</b>, Cornell University, and <b>Kelly Gaddis</b>, Bard College (1056-H7-1908)</p> <p>► 10:30AM (1068) <b>The Algebra Project: Building Math Literacy.</b><br/><b>Marcus Hung</b>, San Francisco Unified School District (1056-H7-406)</p> |
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**MAA Session on Mathematics Courses for the Liberal Arts Students, III**

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<p>8:00 AM - 10:55 AM</p>	<p>Room 2011, 2nd Floor, Moscone</p>
<p>Organizer: <b>Reva Kasman</b>, Salem State College</p>	
<p>8:00AM ► (1069) <b>Mathematics and General Education: Exposing Students to Mathematics and its Tools in the 21st Century.</b> Preliminary report. <b>Manuel J. Sanders</b>, University of South Carolina Beaufort (1056-J1-1668)</p>	

## ***MAA Session on Mathematics, Equity, Diversity, and Social Justice, II***

**8:00 AM - 10:50 AM**      **Room 2022,  
2nd Floor, Moscone**

Organizers: **Patricia Hale**, California State Polytechnic University Pomona  
**Shandy Hauk**, University of Northern Colorado  
**Dave Kung**, St. Mary's College, Maryland

- 8:00AM (1063) *The history, impact, and current efforts of Emerging Scholars Programs.*  
**Natasha M Speer**, University of Maine (1056-H7-1930)

## **MAA Session on Mathematics Courses for the Liberal Arts Students, III**

**8:00 AM - 10:55 AM**      **Room 2011,  
2nd Floor, Moscone**

Organizer: **Reva Kasman**, Salem State College

- (1069) *Mathematics and General Education: Exposing Students to Mathematics and its Tools in the 21st Century.* Preliminary report.  
**Manuel J. Sanders**, University of South Carolina Beaufort (1056-J1-1668)
  - 8:20AM (1070) *Designing a "Math for Liberal Studies" Course.*  
**James E. Hamblin**, Shippensburg University (1056-J1-870)
  - (1071) *Including Presentations as a Component in a Liberal Arts Math History Course.*  
**Sean D Simpson**, Westchester Community College (1056-J1-747)
  - (1072) *Great Ideas of Modern Mathematics: An Approach to a Rigorous Mathematics Course for the Liberal Arts Student.* Preliminary report.  
**Robert A. Blumenthal**, Georgia College & State University (1056-J1-95)
  - (1073) *Teaching the Nature of Applied Mathematics.* Preliminary report.  
**G. Edgar Parker**, James Madison University (1056-J1-458)
  - (1074) *Evolution of the Mathematical Sampler.*  
**Jeffery Thomas McLean**, University of St. Thomas (1056-J1-855)

## *Friday, January 15 – Program of the Sessions*

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| 10:00AM<br>► (1075) | <i>Teaching Quantitative Reasoning with the News.</i> Preliminary report.<br><b>Stuart Boersma*</b> , Central Washington University, Caren L Diefenderfer, Hollins University, Shannon W Dingman and <b>Bernard L Madison</b> , University of Arkansas (1056-J1-508)      | 10:00AM<br>► (1084) | <i>Using QL Modules to Analyze and Present Large Data Sets in a Winter Ecology Course.</i> Preliminary report.<br><b>Judith Moran</b> , Trinity College (1056-P1-1276) |
| 10:20AM<br>(1076)   | <i>Projects &amp; Portfolios Motivate Most.</i><br><b>Rich West</b> , Francis Marion University (1056-J1-1769)  | 10:20AM<br>► (1085) | <i>Modeling Radon in Pennsylvania.</i> Preliminary report.<br><b>Michael Huber</b> , Muhlenberg College (1056-P1-276)  |
| 10:40AM<br>► (1077) | <i>Reaching the Unreachable: Pulling Students Kicking and Screaming into a Mathematical Vortex Where They Transform to Develop Mathematical Eyes through Innovative Approaches and Activities.</i><br><b>Deborah L Gochenaur</b> , Shippensburg University (1056-J1-1974) | 10:40AM<br>► (1086) | <i>Necessary Environmental Numeracy for a Successful Society.</i> Preliminary report.<br><b>Martin E. Walter</b> , University of Colorado, Boulder (1056-P1-847)       |

# ***MAA Session on Quantitative Reasoning and the Environment***

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| 8:00 AM - 10:55 AM | Room 2020,<br>2nd Floor, Moscone  |
| Organizers:        | <b>Maura B. Mast</b> , University of Massachusetts Boston<br><b>Karen D. Bolinger</b> , Clarion University<br><b>Cinnamon Hillyard</b> , University of Washington Bothell   |
| 8:00AM<br>(1078)   | <i>An Across-the-Curriculum Approach to Quantitative Literacy in Environmental Studies.</i><br><b>Ben Steele*</b> , Semra Kılıç-Bahi, Nick Baer, Leon Malan, Laura Alexander and Harvey Pine, Colby-Sawyer College (1056-P1-1639) |
| 8:20AM<br>(1079)   | <i>Water, Water, Everywhere—Even in Statistics.</i><br><b>John C. Nardo*</b> and <b>Judith Lynn Gieger</b> , Oglethorpe University (1056-P1-1948)   |
| 8:40AM<br>► (1080) | <i>Raising Awareness of Environmental Issues in Statistics Course. Preliminary report.</i><br><b>Thomas J Pfaff</b> , Ithaca College (1056-P1-1610)   |
| 9:00AM<br>(1081)   | <i>Sustainability as a Focus for an Introductory Calculus Course.</i><br><b>Michael Olinick</b> , Middlebury College (1056-P1-1093)   |
| 9:20AM<br>► (1082) | <i>Could i-Tree Software Have Helped the Lorax?</i><br><b>Jan O. Case*</b> and <b>Scott W. Beckett</b> , Jacksonville State University (1056-P1-1312)   |
| 9:40AM<br>(1083)   | <i>The Environment, Mathematics and Our Community Role.</i><br><b>Ben Fusaro</b> , Florida State University (1056-P1-1997)  |

*SIAM Minisymposium on Graph Theory, I*

**8:00 AM - 10:55 AM**      **Room 2002,  
2nd Floor, Moscone**

Organizers: **Andre Kundgen**, California State University San Marcos  
**Hal Kierstead**, Arizona State University

- 8:00AM  
(1087) *The thickness and chromatic number of r-inflated graphs.*  
**Michael Albertson**, Smith College,  
**Debra Boutin\***, Hamilton College, and  
**Ellen Gethner**, University of Colorado Denver (1056-05-1063)

8:30AM  
(1088) *The Canonical Coloring Graph.*  
**Ruth Haas**, Smith College (1056-05-963)

9:00AM  
► (1089) *Distinguishing with Mike Albertson.*  
**Karen L. Collins**, Wesleyan University (1056-05-1245)

9:30AM  
(1090) *Looking for a new proof of the Four Color Theorem. Preliminary report.*  
**Walter Stromquist**, Swarthmore College (1056-05-1551)

10:00AM  
(1091) *Finding minors in graphs with a given path structure.*  
**Radhika Ramamurthi\***, Andre Kundgen, California State University San Marcos, and **Michael Pelsmajer**, Illinois Institute of Technology (1056-05-2048)

10:30AM  
► (1092) *Maximum Induced Forests in Graphs of Bounded Treewidth.*  
**Glenn G Chappell**, Department of Computer Science, University of Alaska Fairbanks, and **Michael J. Pelsmajer\***, Illinois Institute of Technology (1056-05-1715)

PME Council Meeting

**8:00 AM - 11:00 AM**      **Sierra F, Marriott  
San Francisco**

## ***Employment Center***

**8:00 AM – 7:00 PM**      **Exhibit Hall, Moscone**

## **Program of the Sessions – Friday, January 15 (cont'd.)**

## ***AMS Session on History of Mathematics***

**8:15 AM - 10:55 AM**      **Room 3010,  
3rd Floor, Moscone**

- 8:15AM (1093) *Ancient Numeral System And The Great Pyramid.* Preliminary report.  
**Ricie Dimatatac Bulanhagui**, Alalum, San Pascual, Batangas (1056-01-399)

8:30AM (1094) *French and English Influences On Early American Mathematics.*  
**Andrew B Perry**, Springfield College (1056-01-692)

► 8:45AM (1095) *Nasir-aldin Tusi: A True Scholare in Many Disciplines.* Preliminary report.  
**Mohammad Moazzam**, Salisbuy University (1056-01-937)

► 9:00AM (1096) *Benjamin Gompertz: Pioneer of Actuarial Science.* Preliminary report.  
**Charlotte K. Simmons\*** and **Jesse W. Byrne**, University of Central Oklahoma (1056-01-1027)

9:15AM Break

9:30AM (1097) *Max Dehn.*  
**David Peifer**, UNC Asheville (1056-01-1042)

► 9:45AM (1098) *Teaching Mathematics at the 19th century Virginia Military Institute.* Preliminary report.  
**Maryam Vulis**, USMA Prep School (1056-01-1734)

► 10:00AM (1099) *On Avicenna's Arithmetic.*  
**Mahmoud H Annaby**, Qatar University (1056-01-1860)

10:15AM (1100) *Euler's work on the prime divisors of numbers of the form  $mx^2 + ny^2$ .*  
**Paul R Bialek\***, Trinity International University, and **Dominic W Klyve**, Carthage College (1056-11-1819)

► 10:30AM (1101) *Origin and Extensions of the Secant Method and Characterizations of the BFGS Secant Method.* Preliminary report.  
**Joanna M. Papakonstantinou**, Rice University (1056-49-673)

► 10:45AM (1102) *Algebraic cryptology from an historical viewpoint.* Preliminary report.  
**Chris Christensen**, Northern Kentucky University (1056-01-1790)

8:30AM ► (1104)	<i>On the enumeration of the cyclically fully commutative elements in Coxeter groups.</i> <b>Tom Boothby</b> , University of Washington, <b>Jeffrey Burkert*</b> , Harvey Mudd College, <b>Morgan Eichwald</b> , University of Montana, <b>Dana C. Ernst</b> , Plymouth State University, <b>Richard M. Green</b> , University of Colorado at Boulder, and <b>Matthew Macauley</b> , Clemson University (1056-05-1861)
8:45AM (1105)	<i>On the cyclically fully commutative elements of Coxeter groups.</i> <b>Tom Boothby</b> , University of Washington, <b>Jeffrey Burkert</b> , Harvey Mudd, <b>Morgan Eichwald</b> , University of Montana, <b>Dana C. Ernst*</b> , Plymouth State University, <b>Richard M. Green</b> , University of Colorado at Boulder, and <b>Matthew Macauley</b> , Clemson University (1056-05-1831)
9:00AM ► (1106)	<i>An explicit derivation of the Möbius function for Bruhat order.</i> <b>Brant C. Jones</b> , University of California, Davis (1056-05-914)
9:15AM	Break
9:30AM ► (1107)	<i>Projections of Ocneanu traces are Kazhdan-Lusztig R-polynomials.</i> <b>W. Andrew Pruett</b> , Baylor University (1056-05-476)
9:45AM (1108)	<i>Symmetric Permutations with No Long Decreasing Subsequences.</i> <b>Eric S Egge</b> , Carleton College (1056-05-249)
10:00AM ► (1109)	<i>Fragility in Matroids.</i> Preliminary report. <b>Carolyn B. Chun*</b> , Dillon Mayhew, Victoria University, <b>Stefan van Zwam</b> , University of Waterloo, and <b>Geoff Whittle</b> , Victoria University (1056-05-1494)
10:15AM ► (1110)	<i>Edge Coverings of Bipartite Graphs and the Geometry of the Hausdorff Metric.</i> <b>Steven Schlicker*</b> , Grand Valley State University, and <b>Katrina Honigs</b> , University of California, Berkeley (1056-51-116)
10:30AM (1111)	<i>Hypergraphic subspace arrangements.</i> <b>Matthew S. Miller*</b> , Bucknell University, and <b>Max Wakefield</b> , United States Naval Academy (1056-55-289)

## **AMS Special Session on Interactions of Inverse Problems, Signal Processing, and Imaging, II**

**8:30 AM - 10:50 AM**      **Room 2010,  
2nd Floor, Moscone**

*AMS Session on Discrete Mathematics, IV*

**8:15 AM - 10:40 AM**      **Room 3003,  
3rd Floor, Moscone**

- 8:15AM *Ramsey Core Numbers. Preliminary report.*  
► (1103) **Allan Edward Bickle**, Western Michigan University (1056-05-1273)

Organizer: **M. Zuhair Nashed,**  
University of Central Florida

- 8:30AM (1112) **A Perturbed Whittaker-Kotel'nikov-Shannon Sampling theorem.**  
**Mahmoud H Annaby\***, Qatar University,  
**Hassan A Hassan**, Cairo University, and  
**Omar H El-Haddad**, Beni Suef University  
(1056-94-1840)

## *Friday, January 15 – Program of the Sessions*

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| <p><b>9:00AM</b> (1113) <i>Convergence and Rate of Approximation for Generalized Sampling-type Operators in Orlicz Spaces.</i><br/> <b>Laura Angeloni</b>, Università degli Studi di Perugia (1056-41-1726)</p> <p><b>9:30AM</b> (1114) <i>Non-uniform sampling expansions and local reconstruction on subspaces of <math>L_2(R)</math>.</i><br/> <b>Nikolaos Dimitrios Atreas</b>, Aristotle University of Thessaloniki, Polytechnic School (1056-94-1137)</p> <p><b>10:00AM</b> (1115) <i>Color Image Restoration Using Nonlocal Mumford-Shah Regularizers.</i><br/> <b>Miyoung Jung</b>, Xavier Bresson, UCLA, <b>Tony F Chan</b>, NSF and UCLA, and <b>Luminita A. Vese*</b>, UCLA (1056-35-1136)</p> <p><b>10:30AM</b> (1116) <i>Approximation Theory in Signal and Image Processing. Applications to Endovascular Surgery.</i><br/> <b>Gianluca Vinti</b>, University of Perugia (1056-94-1602)</p> | <p><b>9:40AM</b> (1120) <i>Online Assessment of Homework in College Algebra and Math Concepts For Teachers Courses.</i><br/> <b>A. S. Elkhader</b>, Northern State University (1056-M1-1571)</p> <p><b>10:00AM</b> (1121) <i>Using WebAssign for Uniform Assessment in Precalculus, 1300 Students at a Time.</i><br/> <b>Lisa Townsley*</b> and <b>Edward Azoff</b>, University of Georgia (1056-M1-1066)</p> <p><b>10:20AM</b> (1122) <i>MathNerds and Webwork: a free, supervised tutoring system for online homework. Preliminary report.</i><br/> <b>W. Ted Mahavier*</b>, Lamar University &amp; MathNerds, <b>Valerio De Angelis</b>, Xavier University of Louisiana &amp; MathNerds, and <b>Kyehong Kang</b>, Lamar University (1056-M1-1141)</p> <p><b>10:40AM</b> (1123) <i>Using Public Domain Software for Online Homework and Tutorials at the University of Puerto Rico.</i><br/> <b>Daniel L McGee*</b> and <b>J Maider Marin</b>, University of Puerto Rico, Mayaguez</p> |
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## **AMS-MAA Graduate Student Fair**

- 8:30 AM - 10:30 AM**      **Room 3001,  
3rd Floor, Moscone**

*Undergrads! Take this opportunity to  
meet representatives from mathematical*

*MAA Session on Online  
Homework—Innovation and Assessment II*

- |                    |   |                                  |
|--------------------|---|----------------------------------|
|                    |   | Room 3002,<br>3rd Floor, Moscone |
|                    | Organizers: <b>Michael E. Gage</b> , University<br>of Rochester   |                                  |
|                    | <b>Arnold K. Pizer</b> , University<br>of Rochester   |                                  |
|                    | <b>Vicki Roth</b> , University of<br>Rochester  |                                  |
| 8:40AM<br>(1117)   | <i>Assessing the Impact on Student<br/>Learning and Behavior in a First Applied<br/>Statistics Course by Innovative Use of<br/>Three Delivery Types Including Online<br/>Homework: Experimental Design and<br/>Implementation.</i><br><b>William H Rybolt*</b> and <b>John<br/>D McKenzie</b> , Babson College<br>(1056-M1-975) |                                  |
| 9:00AM<br>(1118)   | <i>Assessing the Impact on Student<br/>Learning and Behavior in a First Applied<br/>Statistics Course by Innovative Use of<br/>Three Delivery Types Including Online<br/>Homework: Initial Results.</i><br><b>John D McKenzie*</b> and <b>William H<br/>Rybolt</b> , Babson College (1056-M1-976)                               |                                  |
| ► 9:20AM<br>(1119) | <i>Using Multiple Technologies to Engage<br/>Students in Math Learning. Preliminary<br/>report.</i><br><b>Gerald Agbegha*</b> and <b>Nailong Guo</b> ,<br>Johnson C. Smith University<br>(1056-M1-1843)   |                                  |

*MAA Invited Address*



*ASL Invited Address*

- 9:00 AM - 9:50 AM** Room 2004,  
2nd Floor, Moscone

MAA Minicourse #13: Part B

- 9:00 AM - 11:00 AM**      **Pacific J, Marriott  
San Francisco**

*Taking symbols seriously: Teaching form  
and function in college algebra.*

Organizers: **William G. McCallum**,  
University of Arizona  
**Deborah Hughes Hallett**,  
University of Arizona and  
Harvard University  
**Pat Shure**, University of  
Michigan

## **Program of the Sessions – Friday, January 15 (cont'd.)**

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### **MAA Minicourse #4: Part B**

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**9:00 AM – 11:00 AM**                   **Pacific H,  
Marriott San Francisco**

*Using video-case studies in teaching a proof-based gateway course to the mathematics major.*

Organizers: **James T. Sandefur**, Georgetown University  
**Connie M. Campbell**, Millsaps College  
**Kay B. Somers**, Moravian College

### **MAA Minicourse #7: Part B**

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**9:00 AM – 11:00 AM**                   **Pacific I, Marriott  
San Francisco**

*Teaching with clickers in the classroom.*

Organizers: **Derek Bruff**, Vanderbilt University  
**Adam Lucas**, Saint Mary's College of California

### **Student Hospitality Center**

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**9:00 AM – 5:00 PM**                   **South Lobby,  
2nd Floor, Moscone**

### **MAA-Young Mathematicians' Network Panel Discussion**

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**9:00 AM – 10:20 AM**                   **Room 3004,  
3rd Floor, Moscone**

*Promotion and tenure: You know you want it.*

Organizers: **Barry A. Balof**, Whitman College  
**Joshua D. Laison**, Willamette College

Panelists: **Jason D. Rosenhouse**, James Madison University  
**Francis E. Su**, Harvey Mudd College  
**Matthew P. Richey**, St. Olaf College  
**Jacqueline A. Jensen**, Sam Houston State University

### **AMS Special Presentation**

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**9:30 AM – 11:00 AM**                   **Room 2008,  
2nd Floor, Moscone**

*A conversation on nonacademic employment.*

Moderator: **James G. Glimm**, SUNY at Stony Brook

### **Exhibits and Book Sales**

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**9:30 AM – 5:00 PM**                   **Exhibit Hall, Moscone**

### **ASL Invited Address**

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**10:00 AM – 10:50 AM**                   **Room 2004,  
2nd Floor, Moscone**

(1126) *Ramsey theory for finite structures.*  
**Slawomir J. Solecki**, University of Illinois at Urbana-Champaign (1056-03-74)

### **AMS Special Session on Use of Technology in Modern Complex Analysis Research, II**

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**10:00 AM – 10:50 AM**                   **Room 2012,  
2nd Floor, Moscone**

Organizers: **Beth Schaubroeck**, U.S. Air Force Academy  
**Michael Dorff**, Brigham Young University  
**James Rolf**, U.S. Air Force Academy

- 10:00AM ► (1127) *An Introduction to Metacalibration and its Application to Multiple Bubble Problems.*  
**Donald C. Sampson**, **Rebecca Dorff\*** and **James P Dilts**, Brigham Young University (1056-49-468)
- 10:30AM ► (1128) *Convex Combinations of Harmonic Mappings to Regular Polygons.*  
**Jessica A Spicer\***, University of Arkansas, and **Samuel J Ferguson**, University of North Carolina (1056-43-1347)

### **AMS Invited Address**

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**10:05 AM – 10:55 AM**                   **Main Lecture Room, 2nd Floor, Moscone**

(1129) *Zonotopal algebra, analysis, and combinatorics.*  
**Olga Holtz\***, University of California-Berkeley, Technische Universitaet Berlin, Institute for Advanced Study, and **Amos Ron**, University of Wisconsin-Madison (1056-13-6)

### **AMS-MAA Invited Address**

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**11:10 AM – NOON**                   **Main Lecture Room,  
2nd Floor, Moscone**

(1130) *Evolving curves and surfaces.*  
**Brian White**, Stanford University (1056-51-42)

### **MAA Poster Session on Research by Undergraduate Students**

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**NOON – 1:00 PM**                   **North Lobby, 3rd Floor, Moscone**

*Students must set up their posters during this hour.*

## *Friday, January 15 – Program of the Sessions*

*AMS Colloquium Lectures: Lecture III*

**(1131) Reduced decompositions.**  
**Richard P. Stanley**, M.I.T. (1056-05-18)

*MAA Lecture for Students*

*AMS Current Events Bulletin*

1:00 PM - 4:45 PM	Room 3022, 3rd Floor, Moscone
	Organizer: <b>David Eisenbud</b> , University of California, Berkeley
1:00PM (1133)	<i>Approximate groups and their applications: work of Bourgain, Gamburd, Helfgott and Sarnak.</i> <b>Ben J Green</b> , University of Cambridge, UK (1056-11-1569)
2:00PM (1134)	<i>Multivariate stable polynomials: theory and applications.</i> <b>David G. Wagner</b> , University of Waterloo (1056-32-2100)
3:00PM (1135)	<i>The conformal geometry of billiards.</i> <b>Laura DeMarco</b> , University of Illinois at Chicago (1056-37-1737)
4:00PM (1136)	<i>On the Kervaire Invariant Problem.</i> <b>Michael Hopkins</b> , Harvard University (1056-55-1879)

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

- 1:30PM (1138) *Coexistence of Stable ECM Solutions in the Lang-Kobayashi System.*  
**Ericka Mochan\***, Western New England College, and **C. Davis Buenger**, Rice University (1056-34-144)

► 2:00PM (1139) *Greedy Algorithms for Generalized k-rankings of graphs.*  
**Sandra James\***, Concordia University - St. Paul, and **Andrew Zemke**, Rochester Institute of Technology (1056-05-142)

► 2:30PM (1140) *Finding Ramsey Numbers.*  
**Kevin Black\***, Harvey Mudd College, and **Daniel Leven**, Rutgers University (1056-05-143)

3:00PM (1141) *Mathematics Models of Mancala.*  
**Reginald Ford\***, **M. Vergara**, **J. C. Ortega**, **D. Melendez** and **Z. Pena**, James Madison University (1056-91-2094)

► 3:30PM (1142) *Comparison of Homogenous cyclic expressions.*  
**B. Sriram**, Indian Institute of Technology, Kanpur (1056-08-26)

► 4:00PM (1143) *The Strong Symmetric Genus of Small D-type Generalized Symmetric Groups.*  
Preliminary report.  
**Michelle Bowser\***, **Trevor Partridge** and **Kirsten Rodgers**, Grove City College (1056-20-77)

4:30PM (1144) *The Energy of Graphs and Matrices.*  
**Duy D Nguyen\***, Texas Christian University, **Katelyn L McCall**, University of Rochester, **Laura J Buggy**, College of St. Benedict, **Amalia V Culiac**, Mount Holyoke College, and **Sivaram K Narayan**, Central Michigan University (1056-15-78)

► 5:00PM (1145) *Subgraph Summability Number.*  
Preliminary report.  
**Kassandra A Johnston\***, University of New Mexico, **Philip R Zerull**, **Sivaram K Narayan** and **Jordan D Webster**, Central Michigan University (1056-05-79)

## **AMS-MAA Special Session on History of Mathematics. I**

## Program of the Sessions – Friday, January 15 (cont'd.)

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2:00PM (1148)	<i>Descartes, Van Schooten, and algebraic extensions of fields.</i> <b>Michel Pierre Serfaty</b> , Université Paris VII/ Denis Diderot (1056-01-56)	2:00PM (1159)	<i>Length-spectral rigidity for flat metrics.</i> <b>Moon Duchin*</b> , University of Michigan, <b>Christopher J Leininger</b> , University of Illinois, and <b>Kasra Rafi</b> , University of Oklahoma (1056-51-1425)
2:30PM (1149)	<i>Curvature and symmetry in Newton's early computations of orbital dynamics.</i> <b>Michael Nauenberg</b> , UCSC (1056-01-1560)	2:30PM (1160)	<i>The Cut-off Covering Spectrum.</i> <b>Christina Sormani</b> , CUNY Graduate Center and Lehman College, and <b>Guofang Wei*</b> , UC Santa Barbara (1056-53-529)
3:00PM ► (1150)	<i>Johann Bernoulli's lost lecture on differential calculus and its sequels.</i> <b>Ruediger Thiele</b> , Hall, Germany (1056-01-1572)	3:00PM (1161)	<i>Spectral problems for polygons.</i> <b>Julie Rowlett</b> , Hausdorff Center for Mathematics (1056-58-869)
3:30PM ► (1151)	<i>From cascades to calculus: episodes in the history of Rolle's theorem.</i> <b>Jane Barrow-Green</b> , The Open University, Milton Keynes, UK (1056-01-273)	3:30PM	Break
4:00PM (1152)	<i>D company: the rise and fall of differential operator theory in Britain, 1810s-1870s.</i> <b>Ivor O. Grattan-Guinness</b> , Middlesex University, UK (1056-01-1877)	4:00PM (1162)	<i>Eigenvalues and Isoperimetric Inequalities.</i> <b>Jesse Ratzkin</b> , University College Cork (1056-35-283)
4:30PM ► (1153)	<i>Pasch and Klein on intuition and proofs.</i> <b>Dirk Schlimm</b> , McGill University (1056-01-1156)	4:30PM (1163)	<i>Hearing Delzant polygons from the equivariant spectrum.</i> <b>Emily B. Dryden*</b> , Bucknell University, <b>Victor Guillemin</b> , Massachusetts Institute of Technology, and <b>Rosa Sena-Dias</b> , Instituto Superior Técnico, Lisbon (1056-58-1299)
5:00PM ► (1154)	<i>Why was Wantzel Overlooked for a Century? The Changing Importance of an Impossibility Result.</i> <b>Jesper Lützen</b> , University of Copenhagen (1056-01-808)	5:00PM (1164)	<i>The fundamental domain of Random Riemann surfaces.</i> <b>Eran Makover*</b> and <b>Jeff McGowan</b> , Central Connecticut State University (1056-58-527)
5:30PM (1155)	<i>From idea to mathematical object: Herman Minkowski's introduction of general convex sets.</i> <b>Tinne Hoff Kjeldsen</b> , IMFUFA, Roskilde University (1056-01-304)	5:30PM (1165)	<i>The fundamental domain of Random Riemann surfaces.</i> <b>Jeffrey McGowan*</b> and <b>Eran Makover</b> , Central Connecticut State University (1056-58-525)
6:00PM (1156)	<i>Building a Nation: The Evolution of a Mathematical Research Community from the Italian States to the Kingdom of Italy.</i> <b>Laura Martini</b> , Siena, Italy (1056-01-1331)		

### AMS-AWM Special Session on Spectral Problems on Compact Riemannian Manifolds, II

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1:00 PM – 5:50 PM	Room 3003, 3rd Floor, Moscone
	Organizers: <b>Carolyn Gordon</b> , Dartmouth College
	<b>Ruth Gornet</b> , University of Texas at Arlington
	<b>Craig Sutton</b> , Dartmouth College
1:00PM (1157)	<i>Inverse scattering results for manifolds hyperbolic at infinity.</i> <b>David Borthwick</b> , Emory University, and <b>Peter A. Perry*</b> , University of Kentucky (1056-58-1112)
1:30PM (1158)	<i>The genus spectrum of a hyperbolic 3-manifold.</i> <b>D. B. McReynolds*</b> , University of Chicago, and <b>Alan W. Reid</b> , University of Texas in Austin (1056-53-1227)

### AMS Special Session on Commutative Algebra, II

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1:00 PM – 5:50 PM	Room 3011, 3rd Floor, Moscone
	Organizers: <b>Susan Cooper</b> , University of Nebraska-Lincoln
	<b>Graham Leuschke</b> , Syracuse University
	<b>Sean M. Sather-Wagstaff</b> , North Dakota State University
1:00PM (1166)	<i>Ascent and descent modulo exact zero divisors.</i> Preliminary report. <b>Luchezar L. Avramov</b> , <b>Inês Bonacho dos Anjos Henriques*</b> , University of Nebraska-Lincoln, and <b>Liana M. Sega</b> , University of Missouri, Kansas City (1056-13-1604)
1:30PM (1167)	<i>Vanishing of Tor over complete intersections.</i> <b>Olgur Celikbas</b> , University of Nebraska, Lincoln (1056-13-901)
2:00PM (1168)	<i>Infinite Cohen-Macaulay posets and non-Noetherian Stanley-Reisner rings.</i> <b>Erin Chamberlain</b> , Brigham Young University (1056-13-813)

**Friday, January 15 – Program of the Sessions**

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2:30PM (1169)	<i>The rank of a hypergeometric system.</i> <b>Christine Berkesch</b> , Purdue University (1056-14-944)	3:30PM ► (1180)	<i>The distributions of <math>k</math>-drops and <math>k</math>-excedences in permutations.</i> <b>Jeffrey E Liese</b> , California Polytechnic State University, San Luis Obispo (1056-05-949)
3:00PM (1170)	<i>Asymptotic behavior of value semi-groups.</i> <b>S. D. Cutkosky, K. Dalili*</b> , University of Missouri - Columbia, and <b>O. Kashcheyeva</b> , University of Illinois at Chicago (1056-13-2019)	4:00PM (1181)	<i>Wilf equivalence for generalized factor order modulo <math>k</math>.</i> <b>Thomas Langley*</b> , Rose-Hulman Institute of Technology, <b>Jeffrey Liese</b> , California Polytechnic State University, San Luis Obispo, and <b>Jeffrey Remmel</b> , University of California, San Diego (1056-05-1275)
3:30PM (1171)	<i>A New Elementwise Criterion for Weak Subintegrality.</i> <b>Marie A Vitulli</b> , University of Oregon (1056-13-1581)	4:30PM (1182)	<i>A hierarchy of generalized pattern avoidance and <math>\beta(0, 1)</math>-trees.</i> <b>Einar Steingrimsson</b> , Reykjavik University (1056-05-1886)
4:00PM	<i>Discussion</i>	5:00PM ► (1183)	<i>Avoiding Colored Partitions.</i> Preliminary report. <b>Adam Goyt</b> , Minnesota State University, and <b>Lara Pudwell*</b> , Valparaiso University (1056-05-1359)
4:30PM (1172)	<i>Modules over one-dimensional local rings of infinite Cohen-Macaulay type.</i> Preliminary report. <b>Silvia Saccon</b> , University of Nebraska-Lincoln (1056-13-621)	5:30PM ► (1184)	<i>A Continuum of Partition Statistics.</i> <b>Nicholas A. Loehr*</b> , Virginia Tech, and <b>Gregory S. Warrington</b> , University of Vermont (1056-05-487)
5:00PM (1173)	<i>Local rings and high syzygies.</i> Preliminary report. <b>Hamid Rahmati*</b> , Texas Tech university, and <b>Janet Striuli</b> , Fairfield University (1056-13-2028)		
5:30PM (1174)	<i>Constructing Algebras from Witt vectors.</i> <b>Paul C Roberts</b> , University of Utah (1056-13-800)		

**AMS Special Session on Enumerative Combinatorics, II**

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1:00 PM – 5:50 PM	Room 3005, 3rd Floor, Moscone
	Organizers: <b>Brian Miceli</b> , Trinity University <b>Jeff Remmel</b> , University of California San Diego
1:00PM (1175)	<i>Major Index for 01-Fillings of Moon Polyominoes.</i> <b>William Chen</b> , Center for Combinatorics, Nankai University, <b>Svetlana Poznanović*</b> , Catherine Yan, Texas A&M University, and <b>Arthur Yang</b> , Center for Combinatorics, Nankai University (1056-05-1212)
1:30PM ► (1176)	<i>Matrix Bijections.</i> <b>Anthony A. Mendes</b> , California Polytechnic State University, San Luis Obispo (1056-05-166)
2:00PM ► (1177)	<i>Probabilistic proofs of hook length formulas involving trees.</i> <b>Bruce E Sagan</b> , Michigan State U. and NSF (1056-05-519)
2:30PM (1178)	<i>Invariants, Kronecker products and combinatorics of some remarkable diophantine systems.</i> <b>Adriano Garsia</b> , UC, San Diego (1056-05-1881)
3:00PM (1179)	<i>Enumerating (2+2)-free posets by the number of minimal elements and other statistics.</i> <b>Sergey Kitaev</b> , Reykjavik University (1056-05-473)

**AMS Special Session on Differential Galois Theory and Group Representations: A Tribute to Andy Magid, I**

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1:00 PM – 6:20 PM	Room 3007, 3rd Floor, Moscone
	Organizers: <b>James Carrell</b> , University of British Columbia <b>Lourdes Juan</b> , Texas Tech University <b>Alex Lubotzky</b> , Hebrew University <b>Brian Parshall</b> , University of Virginia <b>Marius van der Put</b> , University of Groningen
1:00PM (1185)	<i>Differential ‘Galois’ extensions with new constants.</i> <b>Lourdes Juan*</b> , Texas Tech University, and <b>Andy R. Magid</b> , University of Oklahoma (1056-20-1991)
1:30PM (1186)	<i>Differential Groups and Factorization of Partial Differential Operators.</i> <b>Phyllis J Cassidy</b> , The City College of New York, and <b>Michael F Singer*</b> , North Carolina State University (1056-12-605)
2:00PM (1187)	<i>Infinitesimal differential Galois groups from jet spaces.</i> <b>Thomas Scanlon</b> , University of California, Berkeley (1056-13-839)
2:30PM (1188)	<i>The Galois group of monodromy evolving deformations.</i> <b>Claude Mitschi*</b> , Université de Strasbourg, France, and <b>Michael F. Singer</b> , North Carolina State University, Raleigh (1056-34-1144)

## Program of the Sessions – Friday, January 15 (cont'd.)

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<p>3:00PM (1189) <i>Spin groups as differential Galois groups.</i>  <b>Arne Ledet*</b> and <b>Lourdes Juan</b>, Texas Tech University (1056-12-1040)</p> <p>3:30PM (1190) <i>Geometry of differential Tannakian categories.</i>  <b>Henri Gillet</b>, University of Illinois at Chicago, <b>Sergey Gorchinskiy</b>, Steklov Mathematical Institute, and <b>Alexey Ovchinnikov*</b>, City University of New York (1056-14-1407)</p> <p>4:00PM (1191) <i>Symmetries of Standard Equations.</i>  <b>Camilo Sanabria</b>, The CUNY Graduate Center (1056-34-433)</p> <p>4:30PM ▶ (1192) <i>Differential Galois Theory and Darboux Transformations.</i> Preliminary report.  <b>Primitivo B. Acosta-Humánez</b>, Universidad Sergio Arboleda (1056-34-638)</p> <p>5:00PM (1193) <i>What can Mathematicians Contribute to Research in Education?</i>  <b>Hyman Bass*</b> and <b>Deborah Loewenberg Ball</b>, University of Michigan (1056-97-1520)</p> <p>6:00PM (1194) <i>Galois theory of difference equations with difference parameters.</i>  <b>Benjamin Antieau*</b>, University of Illinois at Chicago, and <b>Alexey Ovchinnikov</b>, City University of New York (1056-13-1328)</p>	<p>3:30PM (1200) <i>Nonvanishing of canonical Hecke L-functions for CM number fields.</i>  <b>Riad Masri*</b> and <b>Tonghai Yang</b>, University of Wisconsin at Madison (1056-11-1363)</p> <p>4:00PM (1201) <i>Higher weight Heegner points.</i>  <b>Kimberly Hopkins</b>, University of Texas at Austin (1056-11-824)</p> <p>4:30PM (1202) <i>Euclidean Prime Degree Galois Number Fields.</i> Preliminary report.  <b>Kevin J McGown</b>, University of California, San Diego (1056-11-308)</p> <p>5:00PM (1203) <i>Divisibility properties of values of partial zeta functions at non-positive integers.</i> Preliminary report.  <b>Barry R. Smith</b>, University of California, Irvine (1056-11-751)</p> <p>5:30PM (1204) <i>Critical zeros of Dirichlet L-functions.</i> Preliminary report.  <b>J. Brian Conrey</b>, American Institute of Mathematics (1056-11-677)</p>
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### AMS Special Session on L-Functions and Analytic Number Theory, II

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1:00 PM – 5:50 PM	Room 3009, 3rd Floor, Moscone
	Organizers: <b>Alina Bucur</b> , Institute for Advanced Study
	<b>Chantal David</b> , Concordia University
	<b>Matilde Lalín</b> , University of Alberta
1:00PM (1195)	<i>Real quadratic analogues of traces of singular moduli.</i> <b>W Duke*</b> , UCLA, <b>O Imamoglu</b> , ETH, and <b>A Toth</b> , Eotvos Lorand University (1056-11-1067)
1:30PM (1196)	<i>Periods and L-functions.</i> <b>Brooke Feigon</b> , University of Toronto (1056-11-1086)
2:00PM (1197)	<i>Periods and central values of quadratic base change L-functions.</i> <b>David Whitehouse</b> , Massachusetts Institute of Technology (1056-11-522)
2:30PM (1198)	<i>The relative trace formula and average values of L-functions.</i> <b>Andrew H. Knightly*</b> , University of Maine, and <b>Charles Li</b> , Chinese University of Hong Kong (1056-11-641)
3:00PM (1199)	<i>Average Frobenius distribution for elliptic curves defined over number fields.</i> <b>Ethan C. Smith*</b> , Michigan Technological University, and <b>Kevin James</b> , Clemson University (1056-11-789)

### AMS Special Session on Recent Advances in Evolution Equations and Applications

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1:00 PM – 6:50 PM	Room 2006, 2nd Floor, Moscone
	Organizers: <b>Guoping Zhang</b> , Morgan State University
	<b>Gaston N'Guerekata</b> , Morgan State University
	<b>Yi Li</b> , University of Iowa
	<b>Wen-Xiu Ma</b> , University of South Florida
1:00PM (1205)	<i>Circular spectrum and bounded solutions of periodic evolution equations in Banach spaces.</i> <b>Gaston M. N'guerekata</b> , Morgan State University (1056-34-995)
1:30PM (1206)	<i>Existence and uniqueness of mild solutions to impulsive fractional differential equations.</i> <b>Gisèle Mophou</b> , Université des Antilles et de la Guyane (1056-35-984)
2:00PM ▶ (1207)	<i>Existence of pseudo almost automorphic solutions to some classes of nonautonomous partial evolution equations.</i> Preliminary report. <b>Toka Diagana</b> , Howard University (1056-34-1149)
2:30PM (1208)	<i>Analytical approaches for solving nonlinear equations.</i> <b>Wen-Xiu Ma</b> , University of South Florida (1056-35-1397)
3:00PM (1209)	<i>Standing wave solutions of the discrete nonlinear Schrödinger equations with site-dependent nonlinearity.</i> Preliminary report. <b>Guoping Zhang</b> , Morgan State University (1056-35-1341)

**Friday, January 15 – Program of the Sessions**

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<p>3:30PM (1210) <i>On Solvability of Initial-Boundary Value Problems for Multi-Weighted Parabolic Systems.</i> Preliminary report. <b>Alexander Kozhevnikov</b>, Univ. of Haifa, Israel (1056-35-24)</p> <p>4:00PM (1211) <i>Front Behavior for Traveling Wave Solutions of a Modified Fisher PDE.</i> <b>Ronald E Mickens</b>, Clark Atlanta University (1056-35-400)</p> <p>4:30PM (1212) <i>Blow-up phenomena due to concentrated nonlinear sources in <math>\mathbb{R}^N</math>.</i> <b>Patcharin Tragoonrisarak</b>, Fort Valley State University (1056-35-312)</p> <p>5:00PM (1213) <i>Well-posedness and regularity of one phase Hele-Shaw bubble problem.</i> Preliminary report. <b>Xuming Xie</b>, Morgan State University (1056-35-85)</p> <p>5:30PM (1214) <i>Multiple Solutions to an Elliptic Problem Related to Vortex Pairs.</i> <b>Yi Li*</b>, University of Iowa, Xian Jiaotong University, and <b>Shuangjie Peng</b>, Central China Normal University (1056-35-1977)</p> <p>6:00PM (1215) <i>Lp Convergence with Rates of Smooth Poisson-Cauchy Type Singular Operators.</i> <b>George A. Anastassiou*</b> and <b>Razvan A Mezei</b>, University of Memphis (1056-41-37)</p> <p>6:30PM (1216) <i>Operator Valued Measures as Feedback Control for Stochastic Systems on Hilbert Space.</i> <b>Nasiruddin U Ahmed</b>, University of Ottawa (1056-49-44)</p>	<p>3:00PM (1219) <i>A Geometric Perspective on Learning Theory and Algorithms.</i> <b>Partha Niyogi</b>, The University of Chicago (1056-68-1536)</p> <p>4:00PM (1220) <i>A multiscale approach to characterize macromolecular dynamics and functions.</i> <b>Cecilia Clementi</b>, Department of Chemistry, Rice University (1056-92-1980)</p> <p>5:00PM ► (1221) <i>Virtual Surgery: Scientific Computing in Real Time.</i> <b>Joseph M Teran</b>, University of California, Los Angeles (1056-65-1802)</p>
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**MAA-AMS-MER Invited Paper Session on Mathematics and Education Reform, III: Refocusing Algebra: From Middle School to College**

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<p>1:00 PM – 5:50 PM</p>	<p style="text-align: right;">Room 3008, 3rd Floor, Moscone</p>
	<p>Organizers: <b>William H. Barker</b>, Bowdoin College <b>William G. McCallum</b>, University of Arizona <b>Bonnie S. Saunders</b>, University of Illinois at Chicago <b>William Haver</b>, Virginia Commonwealth University <b>Donald B. Small</b>, U. S. M. A.</p>
	<p>1:00PM (1222) <i>The Chicago Algebra Initiative: A Multi-University Collaboration with the Chicago Public Schools.</i> <b>Lynn Narasimhan*</b>, DePaul University, and <b>Paul Sally</b>, University of Chicago (1056-BC-1346)</p>
	<p>1:30PM (1223) <i>The Chicago Algebra Initiative: Data and Results.</i> <b>David C Jabon*</b>, DePaul University, and <b>Paul J. Sally, Jr.</b>, University of Chicago (1056-BC-1357)</p>
	<p>2:00PM (1224) <i>Making the Transition from High School Algebra to College Algebra.</i> <b>Erick B Hofacker</b>, University of Wisconsin - River Falls (1056-BC-2053)</p>
	<p>2:30PM ► (1225) <i>MAA/CRAFTY College Algebra Guidelines.</i> <b>Don Small</b>, United States Military Academy (1056-BC-1183)</p>
	<p>3:00PM ► (1226) <i>Modeling Based College Algebra at Virginia Commonwealth University.</i> <b>Bill Haver*</b> and <b>Aimee Ellington</b>, Virginia Commonwealth University (1056-BC-868)</p>
	<p>3:30PM ► (1227) <i>Traversing Bumps Along the Road to a Contemporary College Algebra Curriculum.</i> Preliminary report. <b>Irene M Haskins</b>, Husson University Bangor Maine (1056-BC-1772)</p>
	<p>4:00PM (1228) <i>Refocusing and reMODELING College Algebra - A Team Activity.</i> <b>Erick B Hofacker</b>, University of Wisconsin - River Falls (1056-BC-2052)</p>

**AMS Special Session on The Mathematics of Information and Knowledge, II**

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<p>1:00 PM – 5:40 PM</p>	<p style="text-align: right;">Room 2012, 2nd Floor, Moscone</p>
	<p>Organizers: <b>Naoki Saito</b>, University of California Davis <b>Ronald R. Coifman</b>, Yale University <b>James G. Glimm</b>, SUNY at Stony Brook <b>Peter W. Jones</b>, Yale University <b>Mauro Maggioni</b>, Duke University <b>Jared Tanner</b>, University of Edinburgh</p>
	<p>1:00PM (1217) <i>The Power of Convex Relaxation: Near-optimal Matrix Completion.</i> <b>Emmanuel Candes*</b>, Stanford University, and <b>Terence Tao</b>, University of California, Los Angeles (1056-90-1503)</p>
	<p>2:00PM ► (1218) <i>Challenges in Computational Medicine and Biology.</i> <b>Donald Geman</b>, Johns Hopkins University (1056-92-993)</p>

## Program of the Sessions – Friday, January 15 (cont'd.)

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<p>4:30PM (1229) <i>Retention Benefits of Refocused College Algebra.</i> <b>Bernadette F. Turner*</b> and <b>Donna Stallings</b>, Lincoln University Jefferson City, MO (1056-BC-1761)</p> <p>5:00PM ▶ (1230) <i>Studio College Algebra at Kansas State University.</i> <b>Andrew G Bennett*</b>, <b>Rachel B Manspeaker</b>, <b>Rekha Natarajan</b> and <b>Jennifer Paulhus</b>, Kansas State University (1056-BC-815)</p> <p>5:30PM (1231) <i>Revitalizing Algebra for First-Year College Students: An Attempt to Change Students' Beliefs and Attitudes.</i> <b>Barbara E. Edwards</b>, Oregon State University (1056-BC-1501)</p>	<p>3:00PM (1240) <i>Modeling of Electrostatic-Elastic Membrane Systems Motivated by MEMS Devices.</i> <b>J. Regan Beckham</b>, University of Texas at Tyler (1056-34-1174)</p> <p>3:15PM (1241) <i>Oscillation criteria for some types of second order nonlinear dynamic equations.</i> <b>Billur Kaymakcalan*</b>, Georgia Southern University, <b>Ravi P. Agarwal</b>, Florida Institute of Technology, <b>Said R. Grace</b>, Cairo University, and <b>Wichuta Sae-jie</b>, Mahidol University, Bangkok (1056-34-1221)</p> <p>3:30PM ▶ (1242) <i>Solutions of the Nonlinear Schrödinger Equation with Prescribed Asymptotics at Infinity.</i> Preliminary report. <b>John Bernard Gonzalez</b>, Northeastern University (1056-35-1987)</p> <p>3:45PM (1243) <i>Dirichlet forms on Laakso Spaces.</i> <b>Benjamin Steinhurst</b>, University of Connecticut (1056-34-1368)</p> <p>4:00PM (1244) <i>Existence of solutions for impulsive integral boundary value problems of fractional order.</i> <b>Seenith Sivasundaram</b>, ERAU (1056-34-1434)</p> <p>4:15PM (1245) <i>Models of two-patch predator-prey community dynamics.</i> <b>Faina Berezovskaya</b>, Howard University (1056-34-1665)</p> <p>4:30PM ▶ (1246) <i>Oscillation criteria for second order dynamic inclusions.</i> <b>Elvan Akin-Bohner</b>, Missouri University of Science and Technology (1056-34-1838)</p> <p>4:45PM Break.</p> <p>5:00PM ▶ (1247) <i>Mathematical analysis of synchronization of pacemaker cells in mammals.</i> <b>Menaka B Navaratna*</b>, Florida Gulf Coast University, and <b>Channa N Navaratna</b>, Indiana University of Pennsylvania (1056-34-1229)</p> <p>5:15PM (1248) <i>Analysis of radial stagnation flow toward a stretching cylinder.</i> <b>Antonio Mastroberardino*</b> and <b>Joseph E Paulet</b>, Penn State Erie, The Behrend College (1056-34-1852)</p> <p>5:30PM ▶ (1249) <i>Parameter Dependency on the Period of the Solutions for the Duffing Equation with Double-well Potential.</i> Preliminary report. <b>Ben T Nohara*</b> and <b>A Arimoto</b>, Tokyo City University (1056-34-2043)</p> <p>5:45PM (1250) <i>Conditions for the Existence of a Steady State Solution for a Competition System of Plankton Population.</i> <b>Chihchien Yu</b>, University of Arkansas - Fort Smith (1056-37-261)</p> <p>6:00PM (1251) <i>The Change in Electric Potential due to Lightning.</i> <b>Beyza Aslan*</b>, University of North Florida, and <b>William Hager</b>, University of Florida (1056-35-381)</p>
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### AMS Session on Differential and Difference Equations, IV

1:00 PM – 6:10 PM	Room 3018, 3rd Floor, Moscone
1:00PM (1232) <i>On Stability of Solutions of Fractional Order SEIR Epidemic Model with Vertical Transmission.</i> Preliminary report. <b>Elif Demirci*</b> and <b>Nuri Ozalp</b> , Ankara University (1056-34-448)	
1:15PM (1233) <i>Oscillation of Impulsive Partial Difference Equations with Continuous Variables.</i> <b>Ravi P. Agarwal</b> , Florida Institute of Technology, and <b>Fatma Karakoc*</b> , Ankara University, Turkey (1056-34-492)	
1:30PM (1234) <i>Analysis and Numerical Solution of a Non-local ODE Motivated by Flutter.</i> <b>John V. Matthews*</b> and <b>Boris P. Belinskiy</b> , University of Tennessee at Chattanooga (1056-34-496)	
1:45PM ▶ (1235) <i>Bounded Error Parameter Identification and the Design of Experiments for Models Described by Ordinary Differential Equations.</i> Preliminary report. <b>Adam Fletcher Childers</b> , Roanoke College (1056-34-777)	
2:00PM (1236) <i>Integral inequalities for certain nonlinear systems on time scales.</i> <b>Mehmet Unal</b> , Bahcesehir University (1056-34-851)	
2:15PM ▶ (1237) <i>Cyclic Central Configurations in the Four-Body Problem.</i> Preliminary report. <b>Josep Cors</b> , Universitat Politècnica de Catalunya, <b>Glen R. Hall</b> , Boston University, and <b>Gareth E. Roberts*</b> , College of the Holy Cross (1056-70-972)	
2:30PM (1238) <i>Asymptotically Autonomous Differential Inclusions.</i> Preliminary report. <b>Zhivko S. Athanassov</b> , Bulgarian Academy of Sciences (1056-34-862)	
2:45PM (1239) <i>Dynamics of a segmentation clock model with discrete and distributed delays.</i> <b>Peng Feng</b> , Florida Gulf Coast University (1056-34-873)	

***Friday, January 15 – Program of the Sessions***

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***AMS Session on Mathematics Education***

1:00 PM – 3:55 PM		Room 3010, 3rd Floor, Moscone
1:00PM ► (1252)	<i>Why should humanities majors have all the fun?</i>	<b>Jane W Hartsfield</b> , American University (1056-00-160)
1:15PM ► (1253)	<i>What are they thinking? Examining the mathematical disposition of preservice elementary teachers.</i>	<b>Charles Adam Feldhaus</b> , Ohio University (1056-97-13)
1:30PM (1254)	<i>Why do children in public and rural primary schools perform worse in mathematics: unresolved questions on equitable access to early childhood education?</i>	<b>A. N. Meremikwu</b> , University of Calabar Nigeria (1056-97-209)
1:45PM ► (1255)	<i>Local Research Experience for Undergraduates YSU in the summer of 2008. Preliminary report.</i>	<b>Jacek Fabrykowski</b> , Youngstown State University (1056-97-305)
2:00PM ► (1256)	<i>Examples of a Mathematical Habit of the Mind and its effect on Students.</i>	<b>Richard Millman</b> , Georgia Institute of Technology (1056-97-465)
2:15PM ► (1257)	<i>Undergraduate Research and Service Learning Projects Developed from Institutional Research Questions.</i>	<b>Maria Zack*</b> and <b>Greg Crow</b> , Point Loma Nazarene University (1056-97-846)
2:30PM ► (1258)	<i>Use of ConcepTests and Voting in Upper Division Math Courses.</i>	<b>David O Lomen</b> , University of Arizona (1056-97-1889)
2:45PM ► (1259)	<i>Social Network Surveys in Math and Science Education.</i>	<b>Carole Basile, Steve Culpepper, Steven Di Lisio*</b> , Adam Ruff and Diana White, University of Colorado at Denver (1056-97-1914)
3:00PM (1260)	<i>Mathematics majors' beliefs about mathematics after taking a methods of proof class and professors' beliefs about the effectiveness of such a class.</i>	<b>Elsa Medina</b> , Cal Poly San Luis Obispo (1056-97-2070)
3:15PM (1261)	<i>Trends in Statistics PhD Graduates.</i>	<b>Pam Arroway*</b> and <b>Ashley Swandyb</b> , Department of Statistics, North Carolina State University (1056-00-1595)
3:30PM ► (1262)	<i>Unshackling Linear Algebra from Linear Notation.</i>	<b>Elisha Peterson</b> , United States Military Academy (1056-15-1231)
3:45PM ► (1263)	<i>Disruption of Symmetry Creates New Symmetries. Preliminary report.</i>	<b>Robert M. Sulman</b> , Central Methodist University (1056-00-1232)

***AMS Session on Discrete Mathematics, V***

1:00 PM – 3:40 PM		Room 3006, 3rd Floor, Moscone
1:00PM (1264)	<i>Lower bounds in minimum rank problems.</i>	<b>Lon H Mitchell*</b> , Virginia Commonwealth University, <b>Sivaram K Narayan</b> , Central Michigan University, and <b>Andy Zimmer</b> , University of Illinois (1056-05-903)
1:15PM (1265)	<i>C-sets in an uncountable semigroup. Preliminary report.</i>	<b>John H. Johnson</b> , Howard University (1056-05-905)
1:30PM (1266)	<i>The Rees Product with a Poset or its Dual Poset.</i>	<b>Tricia Muldoon Brown*</b> , Armstrong Atlantic State University, and <b>Margaret Readdy</b> , University of Kentucky (1056-05-910)
1:45PM (1267)	<i>Permutations with Ascending and Descending Blocks.</i>	<b>Jacob N Steinhardt</b> , Massachusetts Institute of Technology (1056-05-979)
2:00PM (1268)	<i>Generalized Oval Derivation.</i>	<b>Timothy L Vis</b> , University of Colorado Denver (1056-05-997)
2:15PM ► (1269)	<i>Potential-Based Strategies for Breaker for Maker-Breaker Tic-Tac-Toe on the Integer Lattice with Numerous Directions.</i>	<b>Klay Kruczak*</b> , Western Oregon University, and <b>Eric Sundberg</b> , Occidental College (1056-91-1917)
2:30PM (1270)	<i>A winning strategy for Maker in the Maker-Breaker version of Tic-Tac-Toe on the integer lattice with numerous winning line directions.</i>	<b>Eric Sundberg*</b> , Occidental College, and <b>Klay Kruczak</b> , Western Oregon University (1056-05-1951)
2:45PM (1271)	<i>Extremal functions of excluded block permutation matrices.</i>	<b>Adam C Hesterberg</b> , Princeton University (1056-05-1113)
3:00PM (1272)	<i>The (1,2)-step competition graph of a tournament.</i>	<b>Sarah K. Merz*</b> , University of the Pacific, and <b>Kim A.S. Factor</b> , Marquette University (1056-05-795)
3:15PM ► (1273)	<i>Elements in unavoidable minors of 3-connected binary matroids. Preliminary report.</i>	<b>Deborah A Chun</b> , Louisiana State University (1056-05-1277)
3:30PM ► (1274)	<i>A degree condition for spanning cycles in bipartite graphs.</i>	<b>Louis DeBiasio*</b> , Andrzej Czygrinow and H. A. Kierstead, Arizona State University (1056-05-1097)

## Program of the Sessions – Friday, January 15 (cont'd.)

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### AMS Session on Dynamical Systems

1:00 PM – 5:25 PM		Room 3020, 3rd Floor, Moscone
1:00PM ▶ (1275)	<i>Computation of Heteroclinic Arcs for Diffeomorphisms of <math>\mathbb{R}^3</math>.</i>	
J. D. Mireles-James*, University of Texas, at Austin, and Hector Lomeli, ITAM, Mexico City, Mexico (1056-37-45)		
1:15PM ▶ (1276)	<i>Scattering of solitary waves in the Fermi-Pasta-Ulam lattice. Preliminary report.</i>	
Aaron Hoffman, Boston University (1056-37-103)		
1:30PM ▶ (1277)	<i>Semigroups of matrices with dense orbits. Preliminary report.</i>	
Mohammad Javaheri, Trinity College (1056-37-137)		
1:45PM ▶ (1278)	<i>Mathematical Analysis of Dengue Treatment Model with Variable Viral Load.</i>	
Salisu Mohammed Garba, University of Manitoba (1056-37-293)		
2:00PM ▶ (1279)	<i>Model of The Drosophila Circadian Clock: Loop Regulation and Transcriptional Integration.</i>	
Hassan M Fathallah-Shaykh*, University of Alabama at Birmingham, and Jerry L Bona, University of Illinois at Chicago (1056-37-693)		
2:15PM	Break	
2:30PM ▶ (1280)	<i>Dynamics of semigroups of Moebius transformations. Preliminary report.</i>	
Sebastian M Marotta*, University of the Pacific, David Fried, Boston University, and Rich Stankewitz, Ball State University (1056-37-793)		
2:45PM ▶ (1281)	<i>Towards billiards of the Koch snowflake. Preliminary report.</i>	
Robert G. Niemeyer* and Michel L. Lapidus, UC Riverside (1056-37-820)		
3:00PM ▶ (1282)	<i>Asymptotics of Grow-Up Solutions and Global Attractors for Slowly Non-Dissipative PDEs. Preliminary report.</i>	
Nitsan Ben-Gal, Brown University (1056-37-1073)		
3:15PM ▶ (1283)	<i>One-parameter interval exchange actions.</i>	
Christopher F Novak, University of Michigan-Dearborn (1056-37-1187)		
3:30PM ▶ (1284)	<i>Extreme value theory for some dynamical systems. Preliminary report.</i>	
Chinmaya Gupta*, University of Houston, Mark Holland, University of Exeter, and Matthew Nicol, University of Houston (1056-37-1243)		
3:45PM ▶ (1285)	<i>Evolving a Smooth Curve of Initial Conditions Under a Time-Dependent Two-Dimensional ODE.</i>	
Paul von Dohlen*, William Paterson University, and Patrick Miller, Stevens Institute of Technology (1056-37-1460)		

4:00PM ▶ (1286)	<i>Newton diagram methods for analysis of the replicator equation.</i>
Faina Berezovskaya*, Howard University, Artem Novozhilov and Georgy Karev, National Institutes of Health, Bethesda, MD (1056-37-1686)	
4:15PM ▶ (1287)	<i>Speedups of Ergodic Group Extensions.</i>
Andrey Babichev*, California State University, Fresno, and Adam Fieldsteel, Wesleyan University (1056-37-1847)	
4:30PM ▶ (1288)	<i>Combinatorial Classification of Cubic Polynomials with a fixed Siegel Disk. Preliminary report.</i>
Ross M Ptacek* and John C Mayer, University of Alabama at Birmingham (1056-37-1942)	
4:45PM ▶ (1289)	<i>The Maximal Inequality and the Ergodic Theorem for Discrete Hausdorff Means. Preliminary report.</i>
Constantine Georgakis, DePaul University (1056-37-1994)	
5:00PM ▶ (1290)	<i>Renormalization and lower-dimensional Brjuno invariant tori of Hamiltonian systems.</i>
Sasa Kocic*, University of Toronto, and Hans Koch, University of Texas at Austin (1056-37-2021)	
5:15PM ▶ (1291)	<i>Symbolic Dynamics for Nonhyperbolic Systems.</i>
David Richeson*, Dickinson College, and Jim Wiseman, Agnes Scott College (1056-58-1811)	

### AMS Session on Computational Mathematics, II

1:00 PM – 5:40 PM		Room 3012, 3rd Floor, Moscone
1:00PM ▶ (1292)	<i>Reconstructing physical parameters in systems of reaction-diffusion equations in electrocardiology.</i>	
Yuan He* and David E Keyes, Department of Applied Physics and Applied Mathematics, Columbia University (1056-65-1058)		
1:15PM ▶ (1293)	<i>Truncated Incomplete Hessian Newton Minimization with Application to Biomolecular Potential Energy Function.</i>	
Mazen George Zarrouk* and Dexuan Xie, University of Wisconsin - Milwaukee (1056-65-1125)		
1:30PM ▶ (1294)	<i>Fast Solvers for Models of Steady Fluid Flow.</i>	
P. A. Lott*, National Institute of Standards & Technology, and H. C. Elman, University of Maryland, College Park (1056-65-1182)		
1:45PM ▶ (1295)	<i>Fighting Gibbs' phenomenon through quotienting. Preliminary report.</i>	
Jean-Paul Berrut, University of Fribourg, Switzerland (1056-65-1185)		

**Friday, January 15 – Program of the Sessions**

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<p>2:00PM ► (1296) <i>Numerical solutions of fourth order boundary value problems using Bernoulli polynomials.</i> Preliminary report. <b>Md Shafiqul Islam</b>, University of Dhaka (1056-65-1223)</p> <p>2:15PM ► (1297) <i>Solving two-dimensional linear and nonlinear Volterra integral equations by the differential transform method.</i> <b>Jang Bongsoo</b>, Ulsan National Institute of Science and Technology (UNIST) (1056-45-1025)</p> <p>2:30PM (1298) <i>Signal Fraction Analysis with Constraints and Extensions.</i> <b>Fatemeh Emdad*</b>, The University of Texas Medical Branch, and <b>Michael Kirby</b>, Colorado State University (1056-00-1188)</p> <p>2:45PM (1299) <i>Reduced Basis Element Method for 2D Maxwell's Problem.</i> <b>Yanlai Chen*</b>, <b>Jan S. Hesthaven</b>, Brown University, and <b>Yvon Maday</b>, Brown University and Paris 6 (1056-65-1298)</p> <p>3:00PM ► (1300) <i>Model and Optimization of Organic Photovoltaic Cells.</i> <b>Amelia McNamara*</b>, Macalester College, <b>Jordan Seering</b>, University of Minnesota-Twin Cities, and <b>Yi Zeng</b>, University of Illinois at Urbana-Champaign (1056-65-1301)</p> <p>3:15PM (1301) <i>Higher order Strang split integral deferred correction methods for Vlasov equations.</i> Preliminary report. <b>Andrew Christlieb</b>, <b>Maureen Morton*</b>, Michigan State University, and <b>Jing-Mei Qiu</b>, Colorado School of Mines (1056-65-1345)</p> <p>3:30PM (1302) <i>Computing Laser Ablation by a Finite-Volume Method.</i> <b>Sean Cohen*</b>, <b>Alina Chertock</b>, North Carolina State University, <b>V. A. Trofimov</b> and <b>I. A. Shirokov</b>, Moscow State University (1056-65-1418)</p> <p>3:45PM Break</p> <p>4:00PM (1303) <i>A Discontinuous Galerkin Solver for Full-Band Boltzmann-Poisson Models.</i> <b>Yingda Cheng*</b>, <b>Irene M Gamba</b>, University of Texas at Austin, <b>Armando Majorana</b>, Università di Catania, and <b>Chi-Wang Shu</b>, Brown University (1056-65-1490)</p> <p>4:15PM (1304) <i>Reconstruction of thin tubular inclusions in three-dimensional domains using electrical impedance tomography.</i> <b>Roland Griesmaier</b>, University of Delaware (1056-65-1548)</p> <p>4:30PM (1305) <i>Delaunay refinement methods for FSI systems undergoing changes in topological properties.</i> Preliminary report. <b>Edward W. Swim</b>, United States Military Academy (1056-65-1713)</p> <p>4:45PM (1306) <i>Resilient Modulus Modeling with information theory approach.</i> <b>Ali S. Shaqlaih*</b>, <b>Luther White</b> and <b>Musharraf Zaman</b>, University of Oklahoma (1056-65-1780)</p>	<p>5:00PM ► (1307) <i>Numerical Study of a Quantum Memory Model.</i> Preliminary report. <b>Charles N. Cook*</b>, Alma College, and <b>Maria Emelianenko</b>, George Mason University (1056-65-1781)</p> <p>5:15PM ► (1308) <i>Domain decomposition method for solving three-dimensional parabolic partial differential equations.</i> <b>Younbae Jun</b>, University of West Alabama (1056-65-1873)</p> <p>5:30PM (1309) <i>The Rapid Advance and Slow Retreat of a Mushy Zone.</i> Preliminary report. <b>Nicholas Gewecke*</b> and <b>Tim Schulze</b>, University of Tennessee, Knoxville (1056-86-269)</p>
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**AMS Session on Functional Analysis and Operator Theory, II**

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1:00 PM – 5:40 PM	Room 3016, 3rd Floor, Moscone
1:00PM (1310) <i>Weighted Composition Operators from <math>H^\infty</math> to the Bloch Space of a Bounded Homogeneous Domain.</i> Preliminary report. <b>Robert F. Allen*</b> , University of Wisconsin – La Crosse, and <b>Flavia Colonna</b> , George Mason University (1056-47-309)	Room 3016, 3rd Floor, Moscone
1:15PM (1311) <i>Eigenvalues for Perturbations of Densely Defined Linear Maximal Monotone Operators.</i> Preliminary report. <b>Dhruba R Adhikari*</b> , Mississippi University for Women, and <b>Athanassios G Kartsatos</b> , University of South Florida (1056-47-577)	Room 3016, 3rd Floor, Moscone
1:30PM (1312) <i>An induced diffusion distance.</i> Preliminary report. <b>Maxim J. Goldberg</b> , Ramapo College of NJ, and <b>Seonja Kim*</b> , SUNY Rockland Community College (1056-47-1005)	Room 3016, 3rd Floor, Moscone
1:45PM (1313) <i>The Generalized Degree for Multifunctions Perturbations of Maximal Monotone Operators and Applications.</i> <b>Boubakari Ibrahimou</b> , Murray State University (1056-47-1008)	Room 3016, 3rd Floor, Moscone
2:00PM ► (1314) <i>Spectral Analysis of Conjugate Self-Adjoint Operators.</i> Preliminary report. <b>Zhong Wang*</b> , Zhaoqing University, and <b>Hongyou Wu</b> , NIU (1056-47-1099)	Room 3016, 3rd Floor, Moscone
2:15PM Break	Room 3016, 3rd Floor, Moscone
2:30PM (1315) <i>Kinds of pseudomonotonicity in study of variational inequalities.</i> <b>Dan D. Pascali</b> , Courant Institute, New York University (1056-47-1142)	Room 3016, 3rd Floor, Moscone
2:45PM (1316) <i>Fixed Point Composition <math>C^*</math>-algebras.</i> <b>Katie Spurrier Quertermous</b> , University of Virginia (1056-47-1165)	Room 3016, 3rd Floor, Moscone
3:00PM (1317) <i>Function theory on a quantum domain.</i> <b>Meghna Mittal</b> , University of Houston (1056-47-1375)	Room 3016, 3rd Floor, Moscone

## **Program of the Sessions – Friday, January 15 (cont'd.)**

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| <p><b>3:15PM</b> (1318) <i>Topology of invariant subspace lattice of shift operators in higher dimensions.</i><br/> <b>Shonia Giorgi</b>, Ohio University Lancaster (1056-47-1399)</p> <p><b>3:30PM</b> (1319) <i>Quantum analog of Donoho-Stark Uncertainty Principle.</i><br/> <b>Genady Grabarnik</b>, York College, CUNY, NY (1056-47-1451)</p> <p><b>3:45PM</b> (1320) <i>Convex and Nonsmooth Analysis of Minimal Time Functions in Banach Spaces.</i><br/> <b>Mau Nam Nguyen</b>, University of Texas-Pan American (1056-49-421)</p> <p><b>4:00PM</b> (1321) <i>Crossed Products by Automorphisms with the Tracial Quasi-Rokhlin Property.</i><br/> <b>Julian Michael Buck</b>, University of Oregon (1056-47-1754)</p> <p><b>4:15PM</b> (1322) <i>n-symmetric Linear Transformations and von Neumann algebras.</i> Preliminary report.<br/> <b>Mark Stankus</b>, California Polytechnic State University Of San Luis Obispo (1056-47-1853)</p> <p><b>4:30PM</b> (1323) <i>Computing the <math>C^*</math>-algebra of an inverse semigroup with the Munn representation.</i><br/> <b>David Milan</b>, University of Texas at Tyler (1056-47-2107)</p> <p><b>4:45PM</b> (1324) <i>Recursive Decomposition of a <math>C^*</math>-subalgebra of <math>C^*(R, X)</math>.</i> Preliminary report.<br/> <b>Hutian Liang</b>, University of Oregon (1056-47-2124)</p> <p><b>5:00PM</b> (1325) <i>On the Nonpositive Solution of the Nonlinear Inverse Autoconvolution Problem.</i><br/> <b>Z Dai*</b>, Alma College, and <b>P K Lamm</b>, Michigan State University (1056-45-1010)</p> <p><b>5:15PM</b> (1326) <i>Good Lambda Inequality and Riesz potentials for Non Doubling Measures in <math>\mathbb{R}^n</math>.</i> Preliminary report.<br/> <b>Mukta B. Bhandari</b>, Kansas State University (1056-42-709)</p> <p><b>5:30PM</b> (1327) <i>Generalized Convolution Systems: Axioms and Properties.</i><br/> <b>Adam W Parr</b>, University of the Virgin Islands (1056-43-1816)</p> | <p><b>1:40PM</b> (1330) <i>Exploring Chaotic Patterns in Chinese Landscape Paintings by Structural Cloning Method.</i> Preliminary report.<br/> <b>Mingjiang Chen</b>, Center for General Education, National Chiao-Tung University (1056-C1-177)</p> <p><b>2:00PM</b> (1331) <i>The Joy of the Curve.</i><br/> <b>Susan A. McBurney</b>, Western Springs, Illinois (1056-C1-299)</p> <p><b>2:20PM</b> (1332) <i>Empirical Origin of the Design Concepts and the Euclidean Geometry.</i><br/> <b>Fatma Mete*</b>, Department of Fiber Science and Apparel Design, Cornell University, and <b>Osman Yurekli</b>, Ithaca College (1056-C1-1580)</p> <p><b>2:40PM</b> (1333) <i>Projective Geometry and The Art of The Renaissance.</i><br/> <b>Meighan I. Dillon</b>, Southern Polytechnic State University (1056-C1-461)</p> <p><b>3:00PM</b> (1334) <i>Modular Perspective in The Music Lesson by Vermeer.</i> Preliminary report.<br/> <b>Helmer Aslaksen</b>, National University of Singapore (1056-C1-591)</p> <p><b>3:20PM</b> (1335) <i>Digital roots, Vedic multiplication and Fibonacci numbers.</i><br/> <b>Fatma Mete</b>, Cornell University, and <b>Yurekli Osman*</b>, Ithaca College (1056-C1-1457)</p> <p><b>3:40PM</b> (1336) <i>Dancing in Mathematical Circles.</i><br/> <b>Karl H. Schaffer</b>, De Anza College, Dr. Schaffer and Mr. Stern Dance Ensemble (1056-C1-2010)</p> <p><b>4:00PM</b> (1337) <i>Dancing and Groups: An Active Activity.</i> Preliminary report.<br/> <b>Melanie Anne Pivarski</b>, Roosevelt University (1056-C1-749)</p> <p><b>4:20PM</b> (1338) <i>The Great Calculus II Art Contest.</i><br/> <b>Pedro Teixeira</b>, Knox College (1056-C1-2011)</p> <p><b>4:40PM</b> (1339) <i>Measuring Complexity of d-Note Pitch Collections Within a c-Note Chromatic Universe.</i><br/> <b>Joshua P. Case</b>, University of Maine at Farmington (1056-C1-1246)</p> <p><b>5:00PM</b> (1340) <i>A Mathematical Tour of Baltimore.</i><br/> <b>Robert Edward Lewand</b>, Goucher College (1056-C1-157)</p> <p><b>5:20PM</b> (1341) <i>The topology of Jorge Luis Borges' Library of Babel.</i><br/> <b>William Goldbloom Bloch</b>, Wheaton College (1056-C1-872)</p> <p><b>5:40PM</b> (1342) <i>Once upon a time there was ... A epistemological "fable" of music and mathematics.</i><br/> <b>Rosanna Iembo*</b>, International Institute of Informatics and Systems, Orlando, Florida, USA; University of Calabria, Italy, and <b>Irene Iaccarino</b>, Crotone, Italy (1056-C1-1020)</p> |
| <b>MAA Session on Arts and Mathematics, I</b>   |   |
| <p><b>1:00 PM - 5:55 PM</b> Room 2022,<br/> <b>2nd Floor, Moscone</b></p> <p>Organizer: <b>Douglas E. Norton</b>, Villanova University</p> <p>► (1328) <i>A Brief Study of Modularity in Mosaic Designs.</i><br/> <b>Reza Sarhangi</b>, Towson University (1056-C1-301)</p> <p>► (1329) <i>Conformal Models of Hyperbolic Geometry.</i> Preliminary report.<br/> <b>Vladimir L. Bulatov</b>, Corvallis, OR (1056-C1-950)</p>  | <p>Organizer: <b>Douglas E. Norton</b>, Villanova University</p> <p>► (1328) <i>A Brief Study of Modularity in Mosaic Designs.</i><br/> <b>Reza Sarhangi</b>, Towson University (1056-C1-301)</p> <p>► (1329) <i>Conformal Models of Hyperbolic Geometry.</i> Preliminary report.<br/> <b>Vladimir L. Bulatov</b>, Corvallis, OR (1056-C1-950)</p>  |

## ***MAA Session on Arts and Mathematics, I***

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

- ▶ 1:00PM (1328) *A Brief Study of Modularity in Mosaic Designs.*  
**Reza Sarhangi**, Towson University  
(1056-C1-301)
  - ▶ 1:20PM (1329) *Conformal Models of Hyperbolic Geometry.* Preliminary report.  
**Vladimir L. Bulatov**, Corvallis, OR  
(1056-C1-950)

***Friday, January 15 – Program of the Sessions***

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***MAA Session on Undergraduate Mathematical Biology, II***

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**1:00 PM – 1:35 PM**

**Room 3002,  
3rd Floor, Moscone**

Organizers: **Timothy D. Comar**,  
Benedictine University  
**Raina S. Robeva**, Sweet Briar  
College

- 1:00PM ► (1343) *Predictive Modeling in Quantitative Biology.*  
**Jeff R Knisley**, East Tennessee State University (1056-Q5-1531)
- 1:20PM ► (1344) *Modeling the Spread of Disease in Undergraduate Microbiology.*  
**Angela B. Shiflet\*** and **George W Shiflet**, Wofford College (1056-Q5-1988)

***MAA Session on General Contributed Papers, VIII***

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**1:00 PM – 5:55 PM**

**Room 3000,  
3rd Floor, Moscone**

Organizers: **Eric S. Marland**,  
Appalachian State University  
**Daniel J. Curtin**, Northern Kentucky University

- 1:00PM ► (1345) *SIGMAA-QL 2009 Quantitative Literacy Survey: Preliminary Results.* Preliminary report.  
**Milo Schield**, Augsburg College (1056-Z1-1088)
- 1:15PM (1346) *Teaching a Senior Seminar in Humanistic Mathematics.*  
**Sarah J Greenwald\*** and **Eric Marland**, Appalachian State University (1056-Z1-182)
- 1:30PM ► (1347) *Reflection Papers on the Big Ideas.*  
**Jeremy Case**, Taylor University (1056-Z1-1448)
- 1:45PM (1348) *Can Instructors Award Partial Credit on Multiple Choice Questions?*  
**Janet L. Braunstein\*** and **Edward W. Swin**, United States Military Academy at West Point (1056-Z1-1992)
- 2:00PM ► (1349) *Refocused College Algebra at Harris-Stowe State University.* Preliminary report.  
**Ann Podleski**, Harris-Stowe State University (1056-Z1-2042)
- 2:15PM (1350) *The Impact of Additional Mathematics Support on Student Performance.*  
**Ciarán Mac an Bhaird\*** and **Ann O'Shea**, National University of Ireland Maynooth (1056-Z1-2119)
- 2:30PM ► (1351) *History of The Return of Applications in Undergraduate Mathematics in the United States.*  
**Walter Meyer**, Adelphi University (1056-Z1-357)

- 2:45PM ► (1352) *50 years of College Math. Have I learned anything? Preliminary report.*  
**Bryan V. Hearsey**, Lebanon Valley College (1056-Z1-368)

- 3:00PM (1353) *One of the first mathematical texts of the Jewish Bookcase.*  
**Greisy Winicki Landman**, Cal Poly Pomona (1056-Z1-288)

- 3:15PM ► (1354) *New Materials on History of Mathematics.*  
**Satish C. Bhatnagar**, University of Nevada Las Vegas (1056-Z1-1712)

- 3:30PM ► (1355) *Mathematicians Card and Poster.* Preliminary report.  
**Sang-Gu Lee** and **Kyung-Won Kim\***, Sungkyunkwan University (1056-Z1-1517)

- 3:45PM ► (1356) *The Elements of Euclid.*  
**Meighan I. Dillon**, Southern Polytechnic State University (1056-Z1-456)

- 4:00PM ► (1357) *British Royal Society: A Fraternity of Experimentalists.*  
**Donna M Pierce**, Whitworth University (1056-Z1-354)

- 4:15PM (1358) *History as a meaning-making tool: Illuminating prospective mathematics teachers' knowledge of algebra.*  
**Kathleen M Clark**, Florida State University (1056-Z1-1440)

- 4:30PM ► (1359) *Winifred Edgerton Merrill - She Opened Doors.*  
**Susan E. Kelly\***, University of Wisconsin-La Crosse, and **Sarah Rozner**, University of Northern Colorado (1056-Z1-1817)

- 4:45PM ► (1360) *Mihailo Petrovic and his interval mathematics.* Preliminary report.  
**Radoslav M. Dimitric**, Pittsburgh (1056-Z1-127)

- 5:00PM (1361) *The Orthogonal Tower for  $\Sigma^\infty \text{Emb}(\coprod_m D^n, V)$ .* Preliminary report.  
**Nicholas Hamblet**, University of Virginia (1056-Z1-1597)

- 5:15PM ► (1362) *Well Behaved Rotation About Planar Non-linear Curves: An analysis of the volume and uniqueness of a solid swept out by rotation about a non-linear axis.* Preliminary report.  
**Adam V Lewicki\*** and **Robert Whitton**, Davidson College (1056-Z1-1543)

- 5:30PM ► (1363) *Three Simple Questions about Tetrahedra.* Preliminary report.  
**Charles Waiveris**, Central Connecticut State University (1056-Z1-1081)

- 5:45PM ► (1364) *Why Automobile Sunshades Fold Oddly: An Intriguing Application of Topology.*  
**Curtis Feist\***, Southern Oregon University, and **Ramin Naimi**, Occidental College (1056-Z1-1355)

## Program of the Sessions – Friday, January 15 (cont'd.)

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### **MAA Session on Philosophy of Mathematics for Working Mathematicians**

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1:00 PM – 4:45 PM		Room 2009, 2nd Floor, Moscone
		Organizers: <b>Bonnie Gold</b> , Monmouth University <b>Carl Behrens</b> , Alexandria, Virginia
1:00PM	► (1365)	<i>What Is the Character of Mathematical Law?</i> <b>James R Henderson</b> , University of Pittsburgh at Titusville (1056-M5-259)
1:30PM	► (1366)	<i>John Stuart Mill's "Pebble Arithmetic" and the Nature of Mathematical Objects.</i> <b>Carl E. Behrens</b> , Alexandria, VA (1056-M5-596)
2:00PM	► (1367)	<i>Dummett Down: Intuitionism and Mathematical Existence.</i> Preliminary report. <b>Thomas Drucker</b> , University of Wisconsin-Whitewater (1056-M5-1635)
2:30PM	► (1368)	<i>The Articulation of Mathematics-A Pragmatic/Constructive Approach to The Philosophy of Mathematics.</i> Preliminary report. <b>Martin E Flashman</b> , Humboldt State University (1056-M5-1771)
3:00PM	► (1369)	<i>Molyneux's Problem.</i> Preliminary report. <b>Lawrence A. D'Antonio</b> , Ramapo College of New Jersey (1056-M5-445)
3:30PM	► (1370)	<i>Mathematical practice and the philosophy of mathematics.</i> Preliminary report. <b>Jeff Buechner</b> , Dept. Philosophy; Rutgers University-Newark and The Saul Kripke Center, CUNY, The Graduate Center (1056-M5-1015)
4:00PM	► (1371)	<i>Being a Realist Without Being a Platonist.</i> Preliminary report. <b>Daniel C. Sloughter</b> , Furman University (1056-M5-444)
4:30PM	► (1372)	<i>An analysis of the notion of natural numer.</i> <b>Ruggero Ferro</b> , University of Verona, Italy (1056-M5-1918)

### **MAA Session on Publishing Mathematics on the Web**

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1:00 PM – 5:15 PM		Room 2011, 2nd Floor, Moscone
		Organizers: <b>Thomas E. Leathrum</b> , Jacksonville State University <b>William F. Hammond</b> , The University at Albany <b>Kyle T. Siegrist</b> , University of Alabama in Huntsville
1:00PM	► (1373)	<i>A multimedia document workflow using docutils.</i> Preliminary report. <b>Matthew Leingang</b> , New York University (1056-N5-630)

1:20PM	<i>Displaying Mathematics with Plain HTML.</i> <b>Claus Schubert</b> , SUNY Cortland (1056-N5-341)
1:40PM	► (1375) <i>The Importance of Good Source Markup.</i> <b>William F. Hammond</b> , University at Albany (SUNY) (1056-N5-712)
2:00PM	(1376) <i>Customizing and Extending Content MathML.</i> Preliminary report. <b>Kyle T. Siegrist</b> , University of Alabama in Huntsville (1056-N5-1662)
2:20PM	► (1377) <i>Math Authoring for the Web Made Easier.</i> <b>Thomas E. Leathrum</b> , Jacksonville State University (1056-N5-547)
2:40PM	► (1378) <i>An RIA Approach to Web Mathematics.</i> <b>Donald W. DeLand</b> , Integre Technical Publishing (1056-N5-1809)
3:00PM	► (1379) <i>Textbooks as Sage Notebooks.</i> <b>Robert A. Beezer</b> , University of Puget Sound (1056-N5-1050)
3:20PM	(1380) <i>MathJax: a JavaScript-based engine for including TeX and MathML in HTML.</i> <b>Davide P. Cervone</b> , Union College (1056-N5-1947)
3:40PM	(1381) <i>WebKit + MathML.</i> <b>R. Alexander Milowski</b> , San Francisco, CA (1056-N5-1505)
4:00PM	► (1382) <i>MathType, Math Markup, and the Goal of Cut and Paste.</i> <b>Robert R. Miner</b> , Design Science, Inc. (1056-N5-1504)
4:20PM	(1383) <i>MathML 3.0.</i> <b>Patrick D. F. Ion</b> , Mathematical Reviews / AMS (1056-N5-1271)
4:40PM	(1384) <i>Revising the MSC (Mathematics Subject Classification).</i> <b>Patrick D. F. Ion</b> , Mathematical Reviews / AMS (1056-N5-1278)
5:00PM	(1385) <i>Tiddly Geometry.</i> Preliminary report. <b>Patrick D. F. Ion</b> , Mathematical Reviews / AMS (1056-N5-1262)

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

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1:00 PM – 4:55 PM		Room 2020, 2nd Floor, Moscone
		Organizers: <b>Keith Weber</b> , Rutgers University <b>Stacy Brown</b> , Pitzer College <b>Natasha A. Speer</b> , University of Maine <b>Karen A. Marrongelle</b> , Portland State University
1:00PM	► (1386)	<i>Appropriating New Definitions: The Case of Lipschitz Functions.</i> <b>Jessica L. Knapp</b> , Pima Community College (1056-P5-1952)

**Friday, January 15 – Program of the Sessions**

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<p>1:40PM ► (1387) <i>Undergraduate students' assessment of the persuasiveness of mathematical arguments: Beyond private and public senses of conviction.</i> <b>Juan Pablo Mejia Ramos*</b>, Rutgers University, and <b>Matthew Inglis</b>, Loughborough University (1056-P5-1350)</p> <p>2:20PM (1388) <i>A design of instructional interventions for the resolution of cognitive dissonance in an advanced calculus class.</i> <b>Kyeong Hah Roh</b>, Arizona State University (1056-P5-2068)</p> <p>2:40PM ► (1389) <i>Between construction and communication: What goes into revising a proof?</i> Preliminary report. <b>Yvonne Lai*</b>, University of Michigan, and <b>Keith H Weber</b>, Rutgers University (1056-P5-1343)</p> <p>3:00PM (1390) <i>Examples, Uncertainty, &amp; Skepticism: An Examination of the Underpinnings of An Intellectual Need for Proof.</i> <b>Stacy A. Brown</b>, Pitzer College (1056-P5-1488)</p> <p>3:20PM (1391) <i>Understanding mathematical proofs: What does it mean and how can it be assessed?</i> Preliminary report. <b>Evan Fuller*</b>, Montclair State University, <b>Keith Weber</b>, <b>Pablo Mejia-Ramos</b>, <b>Kathryn Rhoads</b>, Rutgers, <b>Robert Search</b>, Centenary College, and <b>Aron Samkoff</b>, Rutgers (1056-P5-753)</p> <p>3:40PM ► (1392) <i>Clarifying the Stages of Mathematical Defining: Gestation and Presentation.</i> <b>Paul Christian Dawkins</b>, University of Texas at Arlington (1056-P5-1151)</p> <p>4:00PM ► (1393) <i>Examining Undergraduate Students' Reading and Use of Mathematics Textbooks.</i> <b>Angie Hodge*</b> and <b>Ryan Hiltner</b>, North Dakota State University (1056-P5-2022)</p> <p>4:20PM ► (1394) <i>An Example of a Non-traditional Pedagogy in an Abstract Algebra Class: What is the effect on student motivation?</i> <b>Tim Fukawa-Connelly</b>, University of New Hampshire (1056-P5-184)</p> <p>4:40PM ► (1395) <i>The role of e-assessment in student learning in mathematics.</i> Preliminary report. <b>Douglas Quinney</b>, University of Keele, UK (1056-P5-32)</p>	<p>1:30PM (1397) <i>Hamiltonian Square Cycle in Ore-type Graphs.</i> <b>Phong Q Chau</b>, Arizona State University (1056-05-1511)</p> <p>2:00PM (1398) <i>Tiling in Multipartite Graphs.</i> <b>Ryan Martin</b>, Iowa State University (1056-05-333)</p> <p>2:30PM ► (1399) <i>Decompositions of graphs and hypergraphs.</i> <b>Sebastian M Ciobă</b>, University of Delaware (1056-05-1146)</p> <p>3:00PM (1400) <i>Distributed algorithms and graph theory.</i> <b>Andrzej Czygrinow</b>, Arizona State University (1056-68-908)</p> <p>3:30PM (1401) <i>Adjacency Posets of Planar Graphs.</i> <b>Stefan Felsner</b>, <b>Chingman Li</b>, Institut für Mathematik, Technische Universität Berlin, and <b>William T. Trotter*</b>, Georgia Institute of Technology (1056-05-1582)</p> <p>4:00PM (1402) <i>On extremal problems in a Boolean lattice.</i> Preliminary report. <b>Maria Axenovich*</b>, <b>Jacob Manske</b> and <b>Ryan Martin</b>, Iowa State University (1056-05-1254)</p> <p>4:30PM (1403) <i>Maker-Breaker Games: Building a Big Chain in a Poset.</i> <b>Daniel Cranston*</b>, Virginia Commonwealth University, <b>Bill Kinnersley</b>, <b>Kevin Milans</b>, <b>Greg Puleo</b> and <b>Douglas West</b>, University of Illinois, Urbana-Champaign (1056-05-441)</p> <p>5:00PM ► (1404) <i>Degree Ramsey Numbers of Graphs.</i> Preliminary report. <b>Tao Jiang</b>, Miami University, Ohio, <b>Bill Kinnersley</b>, <b>Kevin G. Milans*</b> and <b>Douglas B. West</b>, University of Illinois at Urbana-Champaign (1056-05-558)</p> <p>5:30PM (1405) <i>Spanning cycles through specified edges in bipartite graphs.</i> <b>Reza Zamani</b> and <b>Douglas B. West*</b>, University of Illinois (1056-05-955)</p>
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**SIAM Minisymposium on Graph Theory, II**

1:00 PM – 5:55 PM	Room 2002, 2nd Floor, Moscone
Organizers: <b>Andre Kundgen</b> , California State University San Marcos <b>Hal Kierstead</b> , Arizona State University	
1:00PM (1396) <i>Equitable list coloring of graphs with low maximum degree.</i> Preliminary report. <b>H. A. Kierstead</b> , Arizona State University, and <b>A. V. Kostochka*</b> , University of Illinois at Urbana-Champaign (1056-05-723)	

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

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1:00 PM – 3:25 PM	Room 2008, 2nd Floor, Moscone
Organizer: <b>Dawn Lott</b> , Delaware State University	
1:00PM (1406) <i>Liquidation of a large block of stock with regime switching.</i> <b>Moustapha N. Pemy*</b> , Towson University, <b>Q Zhang</b> , University of Georgia, and <b>G Yin</b> , Wayne State University (1056-49-469)	
1:30PM ► (1407) <i>Third Graders' Strategies and Preferences for Solving Arithmetic Problems: A Gender Difference Study.</i> <b>Nicola D. Edwards-Omolewa</b> , Delaware State University (1056-97-702)	

## **Program of the Sessions – Friday, January 15 (cont'd.)**

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2:00PM (1408)	<i>Parametric Copula Models for Markovian Processes, for African-American Male Career Heuristics.</i> <b>Kobi A. Abayomi*</b> , Georgia Institute of Technology, School of Industrial Engineering - Statistics Group, <b>Lee Hawkins</b> , Wall Street Journal/CNBC, and <b>Kenneth Land</b> , Duke University (1056-62-1026)	1:45PM (1413)	<i>Rings and Covered Groups.</i> Preliminary report. <b>G. Alan Cannon</b> , Southeastern Louisiana University, <b>C. J. Maxson</b> , Texas A&M University, and <b>Kent M. Neuerburg*</b> , Southeastern Louisiana University (1056-16-412)
2:30PM ► (1409)	<i>Calculating target Cataract Surgical Rates for Africa.</i> <b>Talithia D Williams</b> , Harvey Mudd College (1056-62-1374)	2:00PM ► (1414)	<i>Indecomposable division algebras over function fields of smooth <math>p</math>-adic curves.</i> <b>Feng Chen</b> , Emory University (1056-16-998)
3:00PM (1410)	<i>Brownian motion indexed by a time scale and its applications.</i> <b>Suman Sanyal</b> , Marshall University (1056-60-1340)	2:15PM	Break

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

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1:00 PM – 3:00 PM	Room 3004, 3rd Floor, Moscone	<i>Becoming a teacher of college mathematics: Video cases for novice college mathematics instructor professional development.</i> Organizers: <b>John D. Eggers</b> , University of California San Diego <b>Shandy Hauk</b> , University of Northern Colorado <b>Mark K. Davis</b> , University of Northern Colorado <b>Eric Hsu</b> , San Francisco State University <b>Natasha M. Speer</b> , University of Maine	3:00PM (1417)	<i>Unit-regular Skew Group Rings.</i> <b>Kathi Crow</b> , American University in Cairo (1056-16-1563)
		Panelists: <b>Eric Hsu</b> <b>David E. Meel</b> , Bowling Green State University <b>Natasha M. Speer</b>	3:15PM ► (1418)	<i>A combinatorial approach to the description of endomorphism rings.</i> Preliminary report. <b>Jose A. Velez-Marulanda</b> , University of Iowa (1056-16-1656)
			3:30PM (1419)	<i>Action of the symmetry group of the <math>n</math>-dimensional hypercube on the algebra associated to the Hasse graph of the <math>n</math>-cube.</i> Preliminary report. <b>Colleen Duffy</b> , University of Wisconsin - Eau Claire (1056-16-1814)
			3:45PM	Break
			4:00PM (1420)	<i>Periodicity of quadratic differential equations in nonassociative algebras and dimensions of subalgebras.</i> <b>Nora C. Hopkins</b> , Indiana State University (1056-17-120)
			4:15PM (1421)	<i>On Demazure Crystals of <math>U_q(\widehat{sl}(n))</math>.</i> <b>Julie C Beier</b> , Mercer University (1056-17-183)
			4:30PM (1422)	<i>Nilpotent Orbit Theory and Infinitesimal Blocks of Parabolic Category <math>\mathcal{O}</math>.</i> Preliminary report. <b>Kenyon J Platt*</b> , Brigham Young University, and <b>Bobbe J Cooper</b> , University of Minnesota (1056-17-245)

### **AMS Session on Algebras, I**

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1:15 PM – 5:55 PM	Room 2007, 2nd Floor, Moscone	<i>Idempotents and Annihilators in Endomorphism Rings of Modules.</i> Preliminary report. <b>Gangyong Lee*</b> , The Ohio State University, <b>S. Tariq Rizvi</b> and <b>Cosmin S. Roman</b> , The Ohio State University at Lima (1056-16-112)	4:45PM (1423)	<i>Properties of the Frattini Subalgebra in a Lie algebra.</i> Preliminary report. <b>Kristen Stagg</b> , North Carolina State University (1056-17-363)
1:30PM (1412)	<i>On dualizing the notion of slenderness.</i> Preliminary report. <b>Radoslav M. Dimitric</b> , Pittsburgh (1056-16-129)	5:00PM (1424)	<i>Multipliers of Lie Algebras of Maximal Class.</i> Preliminary report. <b>Lindsey R Bosko</b> , North Carolina State University (1056-17-364)	

## *Friday, January 15 – Program of the Sessions*

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| <p><b>5:15PM</b> (1425) <i>Blocked and Group-Graded Matrix Constructions from Directed Graphs.</i> Preliminary report.<br/> <b>Kenneth L Price*</b> and <b>Stephen Szydlik</b>, University of Wisconsin Oshkosh (1056-17-801)</p> <p><b>5:30PM</b> (1426) <i>Multipliers for the Nilpotent Series of Strictly Upper Triangular Matrices.</i> Preliminary report.<br/> <b>Louis A. Levy</b>, Millersville University (1056-17-1729)</p> <p><b>5:45PM</b> (1427) <i>Tiling spaces and the Baum Connes Conjecture.</i> Preliminary report.<br/> <b>Semail Ulgen Yildirim</b>, Northwestern University (1056-19-559)</p> | <p><b>4:00PM</b> (1435) <i>Implementing Online Homework and Quizzes in a Pre-Calculus Course: Challenges and Rewards.</i> Preliminary report.<br/> <b>Ann E Moskol</b>, Rhode Island College (1056-M1-2029)</p> <p>► <b>4:20PM</b> (1436) <i>Common Innovative Uses of Online Homework Systems Webassign, MyMathLab, and WebWork.</i> Preliminary report.<br/> <b>Semail Ulgen Yildirim</b>, Northwestern University (1056-M1-1841)</p> <p>► <b>4:40PM</b> (1437) <i>The "Third Wave" of WeBWorK Assessment.</i> Preliminary report.<br/> <b>Vicki J Roth*</b>, University of Rochester, and <b>Flora McMartin</b>, Broad-Based Knowledge, LLC (1056-M1-1163)</p> |
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*ASL Invited Address*



## ***MAA Session on Online Homework—Innovation and Assessment, III***

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| 2:00 PM - 4:55 PM  | Room 3002,<br>3rd Floor, Moscone  |
|                    | Organizers: <b>Michael E. Gage</b> , University of Rochester  |
|                    | <b>Arnold K. Pizer</b> , University of Rochester  |
|                    | <b>Vicki Roth</b> , University of Rochester   |
| ► 2:00PM<br>(1429) | <i>What I Learned about Using Online Homeworks from Student Feedback.</i><br><b>Laura A. McSweeney</b> , Fairfield University (1056-M1-1170)  |
| ► 2:20PM<br>(1430) | <i>Increasing Student Success Using Online Homework.</i> Preliminary report.<br><b>Tina Alves Mancuso</b> , The Sage Colleges (1056-M1-1611)  |
| 2:40PM<br>(1431)   | <i>Using WebWork in Linear Algebra.</i><br><b>Thomas R Hagedorn*</b> and <b>Karen Clark</b> , The College of New Jersey (1056-M1-1706)  |
| ► 3:00PM<br>(1432) | <i>Using Online Homework and Data Mining to Assess Student Learning in Mathematics Courses.</i> Preliminary report.<br><b>Michael B Scott</b> , California State University, Monterey Bay (1056-M1-2044)                                    |
| ► 3:20PM<br>(1433) | <i>Online Homework - Does It Work ?</i> Preliminary report.<br><b>Ronnie P Crane</b> , Hawaii Pacific University (1056-M1-2071)   |
| ► 3:40PM<br>(1434) | <i>The Utilization of Discussion Boards for Homework in an Interactive Delivery Course: Linear Algebra and Differential Equations.</i><br><b>Stephanie A. Swainston*</b> and <b>Brynya R. Kohler</b> , Utah State University (1056-M1-1862) |

*MAA Minicourse #11: Part B*

- 2:15 PM – 4:15 PM      Pacific I, Marriott San Francisco**

*The mathematics of Islam and its use in the teaching of mathematics.*

Organizer: **Victor J. Katz**, University of the District of Columbia

*MAA Minicourse #12: Part B*

- 2:15 PM – 4:15 PM      Pacific J, Marriott San Francisco**

*Learning discrete mathematics via historical projects.*

Organizers: **Jerry M. Lodder**, New Mexico State University  
**Guram Bezhanishvili**, New Mexico State University  
**David Pengelley**, New Mexico State University

*MAA Minicourse #6: Part B*

- 2:15 PM – 4:15 PM**      **Pacific H, Marriott  
San Francisco**

*Developing departmental self-studies.*  
Organizers: **Donna L. Beers**, Simmons  
College  
**Nancy Baxter Hastings**,  
Dickinson College

# ***Rocky Mountain Mathematics Consortium Board of Directors Meeting***

- 2:15 PM - 4:10 PM**      **Foothills G2,  
Marriott San Francisco**

## ***MAA Presentations by Teaching Award Recipients***

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## Saturday, January 16 – Program of the Sessions

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

5:15 PM – 7:15 PM	Room 2009, 2nd Floor, Moscone
► (1447) 6:15PM	<i>What is Philosophy of Mathematics? A Case Study of Fictionalism.</i> <b>Charles Chihara</b> , University of California, Berkeley (1056-A0-1220)

### **SIGMAA on Mathematical and Computational Biology Business Meeting and Guest Lecture**

6:00 PM – 8:00 PM	Room 3006, 3rd Floor, Moscone
7:00PM (1448)	<i>Using mathematical approaches to understand and manage spatially distributed populations: From invasive species to fisheries.</i> <b>Alan Hastings</b> , University of California Davis

### **MAA Special Theatrical Presentation**

6:00 PM – 7:00 PM	Room 2020, 2nd Floor, Moscone
	<i>The theater of the mathematically absurd.</i> Presenter: <b>Colin Adams</b> , and the Mobiusbandaid Players

### **AMS Mathematical Reviews Reception**

6:00 PM – 7:00 PM	Foothills G, Marriott San Francisco
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### **SIGMAA on Mathematics and the Arts Business Meeting**

7:00 PM – 8:00 PM	Room 2024, 2nd Floor, Moscone
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### **NAM Cox-Talbot Address**

7:30 PM – 8:15 PM	Club Room, Marriott San Francisco
► (1449)	<i>The Number Zero: Its Origin and Use.</i> <b>Abdulalim Abdullah Shabazz</b> , Grambling University (1056-01-307)

### **SIGMAA on Mathematics and the Arts Special Presentation**

8:00 PM – 9:00 PM	Room 2024, 2nd Floor, Moscone
	<b>Bruce Beasley</b> will discuss his sculptures which consist of intersecting forms that are developed using a computer program.

### **MAA-Project NExT Reception**

8:30 PM – 10:30 PM	Atrium, Marriott San Francisco
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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  
**Gavin LaRose**, University of Michigan

## Saturday, January 16

### **MAA Minority Chairs Breakfast Meeting**

7:00 AM – 8:45 AM	Foothills D, Marriott San Francisco
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### **Joint Meetings Registration**

7:30 AM – 2:00 PM	First Floor Lobby, Moscone
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### **AMS Special Session on Biomathematics: Modeling in Biology, Ecology, and Epidemiology, II**

7:30 AM – 10:50 AM	Room 3003, 3rd Floor, Moscone
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Organizers: **Olcay Akman**, Illinois State University  
**Linda Allen**, Texas Tech University  
**Timothy D. Comar**, Benedictine University  
**Sophia Jang**, Texas Tech University  
**Lih-Ing Roeger**, Texas Tech University

► (1450) 7:30AM *Integrin Dynamics in Motile Cells: A Stochastic Approach.* Preliminary report.  
**Hannah L Callender\***, University of Portland, and **Hans G Othmer**, University of Minnesota (1056-92-614)

► (1451) 8:00AM *Organism-Associated and Mat-Forming Metagenome Statistical Analysis using Random Forests Algorithms.* Preliminary report.

**Mayra Hernandez\***, San Diego State University, **Isaacs Kate**, San Jose State University, **Naneh Apkarian**, Pomona College, **Michelle Creek**, Chapman University, **Eric Guan**, Torrey Pines High School, **Chris Peterson**, Pomona College, and **Todd Regh**, Southern Oregon University (1056-92-1958)

## Program of the Sessions – Saturday, January 16 (cont'd.)

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8:30AM (1452)	<i>Optimal Seasonal Plant Reproduction.</i> Preliminary report. <b>Anthony DeLegge*</b> and <b>Steven Dunbar</b> , University of Nebraska-Lincoln (1056-92-54)	10:00AM ► (1462)	<i>Symmetry and locomotion in theory and experiment.</i> <b>Stephen Childress</b> , New York University, Courant Institute of Mathematical Sciences (1056-76-737)
9:00AM (1453)	<i>Super-spreading events in infectious diseases.</i> Preliminary report. <b>Anna Mummert*</b> and <b>Sydney Mkhatshwa</b> , Marshall University (1056-92-466)	10:30AM ► (1463)	<i>Inverse boundary value problems arising in the diagnosis and treatment of heart disease and breast cancer.</i> <b>David Isaacson*</b> , Rensselaer Polytechnic Institute, <b>J. C. Newell</b> and <b>G. C. Saulnier</b> , RPI (1056-92-310)
9:30AM (1454)	<i>The Dynamics of One-Predator Two-Prey Systems for Integrated Pest Management.</i> Preliminary report. <b>Timothy D Comar*</b> and <b>Pinal Shah</b> , Benedictine University (1056-92-460)		
10:00AM (1455)	<i>Seeking Optimal Treatment Strategies for Malaria Infection.</i> Preliminary report. <b>Jeremy J Thibodeaux</b> , University of Central Oklahoma (1056-92-385)		
10:30AM (1456)	<i>Qualitative Analysis of Models for Anaerobic Digestion including Syntrophic Interactions.</i> Preliminary report. <b>Marion Weedermann</b> , Dominican University (1056-34-125)		

### AMS Special Session on Mathematics and Physical Experiment, II

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7:30 AM – 10:50 AM		Room 3007, 3rd Floor, Moscone
	Organizers:	<b>Roger Thelwell</b> , James Madison University <b>Anthony Tongen</b> , James Madison University <b>Paul Warne</b> , James Madison University
► (1457)	<i>Spreading Surfactant on a Thin Liquid Layer.</i> <b>Ellen Peterson*</b> and <b>Michael Shearer</b> , North Carolina State University (1056-76-472)	
► (1458)	<i>Particle size segregation in granular flow.</i> <b>Michael Shearer*</b> , North Carolina State University, <b>Laura Golick</b> , Emory University, Georgia, <b>Lindsay H May</b> , Baltimore, MD, and <b>Karen E Daniels</b> , North Carolina State University (1056-76-1284)	
► (1459)	<i>Simulation and validation of 3-dimensional fatigue cracks.</i> <b>David L Chopp</b> , Northwestern University (1056-74-2101)	
► (1460)	<i>Mathematical theory of particle laden flow.</i> <b>Andrea Bertozzi</b> , UCLA (1056-76-178)	
9:30AM (1461)	<i>Dynamics of Free Surface Perturbations Along an Annular Viscous Film Flowing Down a Vertical Fiber.</i> <b>Linda B. Smolka*</b> , <b>Dennis Fillebrown</b> , Bucknell University, <b>Bree Guerra</b> , University of Texas at Austin, and <b>Justin North</b> , Ohio State University (1056-76-1561)	

### AMS Session on Probability and Statistics, IV

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7:45 AM – 8:55 AM	Room 3010, 3rd Floor, Moscone
7:45AM ► (1464)	<i>The minimum measure of concordance in a multivariate version of Spearman's rank correlation.</i> Preliminary report. <b>Raymond E. Molzon</b> , Michigan Technological University (1056-62-2020)
8:00AM ► (1465)	<i>The Mid-Pleistocene Transition: From Forcing to Pacing of Glaciers.</i> Preliminary report. <b>Eric R Ruggieri*</b> and <b>C. Lawrence</b> , Brown University (1056-62-2095)
8:15AM (1466)	<i>Characterization and Dispersive Ordering of the Cauchy, Gauss and Logistic Laws.</i> <b>Broderick Oluyede</b> , Georgia Southern University (1056-62-1351)
8:30AM ► (1467)	<i>Compound Covariate Predictor (CCP) Classification Technique Applied on More Than Two Groups Gene Expression data.</i> Preliminary report. <b>Akram M. Almohalwas</b> , Central Michigan University (1056-62-1426)
8:45AM (1468)	<i>Schroedinger-Type Eigenmaps for the Analysis and Classification of Multispectral Data in Bio-Medical Imaging.</i> <b>Martin Ehler*</b> , Norbert Wiener Center, University of Maryland, and <b>Wojciech Czaja</b> , University of Maryland (1056-58-2036)

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

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8:00 AM – 10:50 AM	Room 2000, 2nd Floor, Moscone
	Organizers: <b>Darren Narayan</b> , Rochester Institute of Technology <b>Bernard Brooks</b> , Rochester Institute of Technology <b>Jacqueline Jensen</b> , Sam Houston State University <b>Carl V. Lutzer</b> , Rochester Institute of Technology <b>Vadim Ponomarenko</b> , San Diego State University <b>Tamas Wiandt</b> , Rochester Institute of Technology

## *Saturday, January 16 – Program of the Sessions*

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| 8:00AM<br>(1469)    | <i>Knots, Sticks, and Indicatrix.</i> Preliminary report.<br><b>Bena Tshishiku*</b> , Washington and Lee University, <b>Dan Collins</b> , Cornell University, <b>Charmaine Sia</b> , MIT, <b>Rob Silversmith</b> , Katherine Hawkins and <b>Colin Adams</b> , Williams College (1056-57-966)  | 9:00AM<br>▶ (1477) <i>Mathematics as imperialism? The role of mathematicians in the political expansion of British mathematical practices.</i> <b>Josipa G Petrunic</b> , University College London (1056-01-1249)           |
| 8:30AM<br>▶ (1470)  | <i>Planar and Spherical Stick Indices of Torus Knots.</i><br><b>Colin Adams</b> , Williams College, <b>Dan Collins</b> , Cornell University, <b>Katherine Hawkins</b> , Williams College, <b>Charmaine Sia</b> , Massachusetts Institute of Technology, <b>Rob Silversmith*</b> , Williams College, and <b>Bena Tshishiku</b> , Washington and Lee University (1056-57-422) | 9:30AM<br>▶ (1478) <i>A comparison of Edwin Abbott Abbott and Lewis Carroll.</i> Preliminary report. <b>William F. Lindgren*</b> , Slippery Rock University, and <b>Thomas F. Banchoff</b> , Brown University (1056-01-1184) |
| 9:00AM<br>▶ (1471)  | <i>Symplectic Volumes and Ribbon Graphs.</i><br><b>Julia C Bennett*</b> , Bard College, <b>David V Cochran</b> , Virginia Commonwealth University, and <b>Kaitlin Woskoff</b> , Hartwick College (1056-53-82)   | 10:00AM<br>▶ (1479) <i>The Early Years of G.H. Hardy's career.</i> <b>Brenda Davison</b> , Simon Fraser University (1056-01-482)   |
| 9:30AM<br>▶ (1472)  | <i>Modulation Frames and Infinite Symmetric Matrices.</i><br><b>Robert G. Fraser*</b> , Case Western Reserve University, <b>Andrew Dugowson</b> , Pomona College, and <b>Yeonhyang Kim</b> , Central Michigan University (1056-46-88)   | 10:30AM<br>▶ (1480) <i>Joel E. Hendricks and the Analyst.</i> Preliminary report. <b>James J Tattersall</b> , Providence College (1056-01-494)   |
| 10:00AM<br>▶ (1473) | <i>Continuous Frames on Manifolds.</i> Preliminary report.<br><b>Daniel Freeman</b> , Texas A&M University, <b>Daniel Poore</b> , Pomona College, <b>A. Rebecca Wei*</b> , Case Western Reserve University, and <b>Madeline Wyse</b> , Pomona College (1056-58-92)  |  |
| 10:30AM<br>▶ (1474) | <i>The Isoperimetric Problem in Sectors with Disk Density.</i><br><b>Alexander Diaz*</b> , Universidad de Puerto Rico Mayaguez Campus, <b>Nate Harman</b> , University of Massachusetts, Amherst, <b>Sean Howe</b> , University of Arizona, Tucson, and <b>David Thompson</b> , Williams College (1056-53-99)   |  |

## **AMS-MAA Special Session on History of Mathematics. II**

**8:00 AM - 10:50 AM**      **Room 2010,  
2nd Floor, Moscone**

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

- 8:00AM "Ad Calculum Sinuum": Thomas Harriot's Sine Table Interpolation Formulas.  
► (1475) **Janet L Beery**, University of Redlands  
(1056-01-1116)
  - 8:30AM Newton's Proof of Heron's Formula.  
► (1476) **William Dunham**, Muhlenberg College  
(1056-01-335)

## **AMS-SIAM Special Session on Applications of Algebraic Geometry, I**

**8:00 AM - 10:50 AM**      **Room 3005,  
3rd Floor, Moscone**

Organizers: **Frank Sottile**, Texas A&M University

**Luis Garcia-Puente, Sam**  
**Houston State University**

- 8:00AM (1481) *Algebraic aspects of persistence.*  
**Gunnar Erik Carlsson**, Stanford University (1056-55-1638)

► 8:30AM (1482) *From Isomap to Persistence: nonlinear dimensionality reduction with circular coordinates.*  
**Vin de Silva**, Pomona College (1056-68-2149)

► 9:00AM (1483) *Topological data analysis and the nudged elastic band method.* Preliminary report.  
**Henry Adams\***, **Gunnar Carlsson**, Stanford University, and **Atanas Atanassov**, Columbia University (1056-55-2063)

► 9:30AM (1484) *Recovering exact results from numerical computation in algebraic geometry.*  
**Daniel J. Bates\***, Colorado State University, **Jonathan D. Hauenstein**, Fields Institute/Texas A&M, **Tim McCoy**, University of Notre Dame, **Chris Peterson**, Colorado State University, and **Andrew J. Sommese**, University of Notre Dame (1056-14-1120)

► 10:00AM (1485) *Computing Hilbert functions using dual bases.* Preliminary report.  
**Jonathan D Hauenstein**, Fields Institute/Texas A&M (1056-14-1178)

► 10:30AM (1486) *Zebra Fish, Tumor Growth, and Algebraic Geometry.*  
**Andrew Sommese**, University of Notre Dame (1056-14-2079)

## Program of the Sessions – Saturday, January 16 (cont'd.)

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### AMS Special Session on Categorical and Algebraic Methods in Representation Theory, I

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8:00 AM – 10:50 AM		Room 3009, 3rd Floor, Moscone
		Organizers: <b>Jon Brundan</b> , University of Oregon <b>Julia Pevtsova</b> , University of Washington <b>Eric Friedlander</b> , University of Southern California
8:00AM (1487)	<i>Morita Equivalence Revisited.</i>	<b>Paul Frank Baum</b> , Pennsylvania State University (1056-16-520)
8:30AM (1488)	<i>A combinatorial approach to Specht module cohomology.</i>	<b>David J Hemmer</b> , University at Buffalo, State University of New York (1056-20-860)
9:00AM (1489)	<i>Vanishing ranges for the cohomology of finite groups of Lie type.</i>	<b>Christopher P. Bendel*</b> , University of Wisconsin-Stout, <b>Daniel K. Nakano</b> , University of Georgia, and <b>Cornelius Pillen</b> , University of South Alabama (1056-20-434)
9:30AM (1490)	<i>Low Degree Cohomology for Finite Simple Groups.</i>	<b>Robert M Guralnick*</b> , University of Southern California, and <b>Pham Huu Tiep</b> , University of Arizona (1056-20-450)
10:00AM (1491)	<i>Support varieties and representation type.</i>	<b>Joerg Feldvoss</b> , University of South Alabama, and <b>Sarah Witherspoon*</b> , Texas A&M University (1056-16-598)
10:30AM (1492)	<i>Bundles and submodule functors.</i> Preliminary report.	<b>Jon F Carlson*</b> , University of Georgia, <b>Eric M Friedlander</b> , University of Southern California, and <b>Julia Pevtsova</b> , University of Washington (1056-20-867)

### AMS Special Session on Harmonic Analysis and Representations of Reductive $p$ -adic Groups, I

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8:00 AM – 10:40 AM		Room 3011, 3rd Floor, Moscone
		Organizers: <b>Robert Doran</b> , Texas Christian University <b>Paul Sally</b> , University of Chicago <b>Loren Spice</b> , Texas Christian University
8:00AM (1493)	<i>Characters Tell All: The Plancherel Formula Done Right.</i> Preliminary report. <b>Paul J Sally*</b> , University of Chicago, and <b>Loren Spice</b> , Texas Christian University (1056-22-825)	

8:50AM (1494)	<i>Invariant distributions supported on compact elements.</i> <b>Stephen M DeBacker</b> , University of Michigan (1056-22-2035)
9:20AM (1495)	<i>Parametrizing Nilpotent Orbits in Symmetric Spaces Using Bruhat-Tits Theory.</i> <b>Ricardo Portilla</b> , University of Michigan-Ann Arbor (1056-20-1365)
9:50AM (1496)	<i>Geometric Structure in the Representation Theory of Reductive <math>p</math>-adic Groups.</i> <b>Paul Frank Baum</b> , Pennsylvania State University (1056-22-136)
10:20AM (1497)	<i>On some local <math>L</math>-packets and character sheaves.</i> <b>Clifton Cunningham</b> , University of Calgary (1056-11-1038)

### AMS Special Session on Integrability of Dynamical Systems and Solitons Equations, I

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8:00 AM – 10:50 AM		Room 3016, 3rd Floor, Moscone
		Organizers: <b>Zhijun Qiao</b> , University of Texas-Pan American <b>Taixi Xu</b> , Southern Polytechnic State University <b>Wenxiu Ma</b> , University of South Florida
8:00AM (1498)	<i>On meromorphic solutions to the Korteweg-de Vries equation with non-decaying initial data supported on a left half line.</i>	<b>Alexei Rybkin</b> , University of Alaska Fairbanks (1056-35-1218)
8:30AM (1499)	<i>Integrable systems and invariant geometric flows in similarity and projective geometries.</i>	<b>Changzheng Qu</b> , Northwest University, P. R. China (1056-35-2086)
9:00AM (1500)	<i>On the Long-Time H2-Stability of the Implicit Euler Scheme for the 2D Magnetohydrodynamics Equations.</i>	<b>Florentina Tone</b> , University of West Florida (1056-35-913)
9:30AM (1501)	<i>Stability of the Positive Steady States for a Nonhomogeneous Semilinear Parabolic Problem.</i>	<b>Yi Li*</b> , University of Iowa, Xian Jiaotong University, and <b>Baishun Lai</b> , Hunan Normal University and Henan University (1056-35-1982)
10:00AM (1502)	<i>Quantizations of differential operator modules.</i>	<b>Charles H Conley</b> , University of North Texas (1056-17-665)
10:30AM (1503)	<i>Component-trace identities and Hamiltonian structures of integrable couplings.</i>	<b>Wen-Xiu Ma</b> , University of South Florida (1056-37-1393)

**Saturday, January 16 – Program of the Sessions**

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**AMS Special Session on Interactions of Inverse Problems, Signal Processing, and Imaging, III**

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8:00 AM – 10:50 AM		Room 2022, 2nd Floor, Moscone
		Organizer: <b>M. Zuhair Nashed</b> , University of Central Florida
8:00AM ► (1504)		<i>An analysis of the singular values from the binary information with its preserver and patternization.</i> <b>Duk-Sun Kim*</b> and <b>Sang-Gu Lee</b> , Sungkyunkwan University (1056-15-1162)
8:30AM (1505)		<i>A novel kernel correlation model with correspondence estimation.</i> <b>Pengwen Chen</b> , University of Connecticut (1056-49-644)
9:00AM (1506)		<i>Multiscale Registration of Planning CT and Daily Cone Beam CT Images for Adaptive Radiation Therapy.</i> <b>Dana Paquin*</b> , California Polytechnic State University, <b>Doron Levy</b> , Department of Mathematics and CSCAMM, University of Maryland, and <b>Lei Xing</b> , Stanford University (1056-92-432)
9:30AM (1507)		<i>Regularization of Inverse Magnetoencephalography by a Spline Method.</i> <b>Michel Volker</b> , Geomathematics Group, University of Siegen, Germany (1056-65-513)
10:00AM (1508)		<i>Stack filter classifiers with an application to change detection in images.</i> <b>G. Beate Zimmer*</b> , Texas A&M University-Corpus Christi, <b>Reid Porter</b> and <b>Don Hush</b> , Los Alamos National Laboratory (1056-68-121)
10:30AM (1509)		<i>On Weakly Bounded Noise in Ill-Posed Problems.</i> <b>P. P. B. Eggermont*</b> , V. N. LaRiccia, Food and Resource Economics, University of Delaware, and <b>M. Z. Nashed</b> , University of Central Florida (1056-47-1818)

**AMS Special Session on Optimal Frames and Operator Algebras, I**

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8:00 AM – 10:50 AM		Room 2012, 2nd Floor, Moscone
		Organizers: <b>David Larson</b> , Texas A&M University
		<b>Deguang Han</b> , University of Central Florida
		<b>Shidong Li</b> , San Francisco State University
8:00AM (1510)		<i>Sparse approximations and the minimum subspace approximation property.</i> <b>Akram Aldroubi*</b> , Vanderbilt University, and <b>Romain Tessera</b> , CNRS, Ecole Normal Sup., Lyon (1056-47-322)

8:30AM (1511)	<i>Filter bank fusion frames.</i> <b>Matthew Fickus*</b> , Air Force Institute of Technology, <b>Amina Chebira</b> , Swiss Federal Institute of Technology Lausanne, and <b>Dustin G. Mixon</b> , Princeton University (1056-42-523)
9:00AM ► (1512)	<i>Distance estimates and a flow converging to equal-norm Parseval frames.</i> <b>Bernhard G Bodmann*</b> , University of Houston, and <b>Peter G Casazza</b> , University of Missouri (1056-46-535)
9:30AM (1513)	<i>A frame theoretic construction for spectral imaging data.</i> Preliminary report. <b>John J. Benedetto</b> , Norbert Wiener Center, University of Maryland (1056-42-564)
10:00AM (1514)	<i>Spanning Properties of Frames.</i> <b>Peter G. Casazza*</b> , University of Missouri, <b>Bernhard G. Bodmann</b> , <b>Vern I. Paulsen</b> , University of Houston, and <b>Darrin Speegle</b> , St. Louis University (1056-46-635)
10:30AM (1515)	<i>Frames for <math>L^2</math> of measures with scale self-similarity.</i> Preliminary report. <b>Palle E. T. Jorgensen</b> , University of Iowa (1056-46-761)

**AMS Special Session on Parabolic Geometries, Integrable Systems, and Twistor Theory, I**

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8:00 AM – 10:40 AM		Room 2006, 2nd Floor, Moscone
		Organizers: <b>Dana Mihai</b> , Carnegie Mellon University
		<b>Jonathan Holland</b> , University of Pittsburgh
		<b>George Sparling</b> , University of Pittsburgh
8:00AM (1516)		<i>Weyl and the foundations (1918, 1929) of gauge theory.</i> <b>Alexander Afriat</b> , Université de Bretagne Occidentale (PaHST & REHSEIS) (1056-83-1022)
8:30AM (1517)		<i>Affine sphere equation, Hitchin system and Painlevé III.</i> <b>Prim Plansangkate</b> , Centre de recherches mathématiques (1056-51-634)
9:00AM (1518)		<i>Invariants of projective structures on surfaces and some applications.</i> <b>Robert L Bryant</b> , University of California at Berkeley and MSRI (1056-53-31)
10:00AM (1519)		<i>Four-dimensional metrics conformal to Kahler.</i> <b>M. Dunajski</b> , University of Cambridge (1056-53-562)

## **Program of the Sessions – Saturday, January 16 (cont'd.)**

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### **MAA-AMS Invited Paper Session on the Scholarship of Teaching and Learning in Mathematics**

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8:00 AM – 10:50 AM		Room 3008, 3rd Floor, Moscone
Organizers:		Jacqueline M. Dewar, Loyola Marymount University Thomas F. Banchoff, Brown University Pam Crawford, Jacksonville University
8:00AM ► (1520)	<i>SoTL in the Mathematics Content Preparation of Teachers: Infusing K-12 Exemplars in the Undergraduate Mathematics Curriculum.</i> <b>Kathryn T Ernie</b> , University of Wisconsin - River Falls (1056-BE-1719)	
8:30AM (1521)	<i>Research Experiences for Pre-service and In-service Secondary Mathematics Teachers.</i> <b>Saad El-Zanati*</b> , David Barker and Wendy O'Hanlon, Illinois State University (1056-BE-462)	
9:00AM ► (1522)	<i>Assessing Student Learning in an Introductory-Level Mathematics Course with a Sustainability Emphasis.</i> <b>Rikki B Wagstrom</b> , Metropolitan State University (1056-BE-1306)	
9:30AM ► (1523)	<i>Preliminary Thoughts on Quantitative Literacy.</i> Preliminary report. <b>Michael C Burke</b> , College of San Mateo (1056-BE-1510)	
10:00AM ► (1524)	<i>What is inquiry? What is evidence?</i> <b>Rose Asera</b> , Carnegie Foundation for the Advancement of Teaching (1056-BE-1832)	
10:30AM ► (1525)	<i>Differentiating Instruction in a Large Lecture Class.</i> Preliminary report. <b>Andrew G Bennett*</b> , Rachel Manspeaker, Danielle McNaney and Ala Alnaser, Kansas State University (1056-BE-1454)	

### **AMS Session on Computational Mathematics, III**

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8:00 AM – 10:55 AM		Room 3012, 3rd Floor, Moscone
8:00AM (1526)		<i>Mathematical Modeling of Tail Movement.</i> <b>Glenn Steven Young*</b> , Anthony L. Tongen, James Madison University, Nina Bence and Corey Cleland, Department of Biology, James Madison University (1056-65-1916)
8:15AM (1527)	<i>Analysis of 3D Potts Model Monte Carlo Simulation of Crystalline Grain Growth.</i> <b>Joshua D. Snyder</b> , George Mason University (1056-65-1962)	
8:30AM (1528)	<i>An optimization-based approach to discretizing the eikonal equation.</i> <b>Christopher M Kuster</b> , Carroll University (1056-65-1973)	

8:45AM ► (1529)	<i>HSS preconditioning techniques for the Navier-Stokes equations.</i> Preliminary report. <b>Jia Liu</b> , University of West Florida (1056-65-2069)	
9:00AM (1530)	<i>A Spectral Time-Domain Method for Computational Electrodynamics.</i> Preliminary report. <b>James V Lambers</b> , University of Southern Mississippi (1056-65-2073)	
9:15AM (1531)	<i>Interpolation error estimates for hexahedral finite elements: geometrical approach.</i> <b>Kanagaratnam Arunakirinathar</b> , University of Kwa-Zulu Natal (1056-65-2078)	
9:30AM ► (1532)	<i>Decomposition Method for Henry's Problem.</i> <b>Julia Petereit</b> , University of Nevada, Reno (1056-41-679)	
9:45AM ► (1533)	<i>Parallel Performance of Some SHA-3 Second Round Candidates.</i> Preliminary report. <b>Jason Worth Martin</b> , James Madison University (1056-12-2077)	
10:00AM (1534)	<i>Multistep Kinetic Monte Carlo.</i> Preliminary report. <b>Holly N. Clark*</b> and <b>Tim P. Schulze</b> , University of Tennessee, Knoxville (1056-76-285)	
10:15AM (1535)	<i>Application of the Riemann-Hilbert technique to a problem of a supercavitating wedge.</i> <b>Anna Zemlyanova*</b> and <b>Yuri Antipov</b> , Louisiana State University (1056-76-338)	
10:30AM (1536)	<i>Comparisons of Different Groove Structures in a Steady-Liquid Flow for Designing Efficient Micro Heat Pipes.</i> <b>Mulugeta Markos</b> , North Carolina Wesleyan College (1056-76-742)	
10:45AM (1537)	<i>Flow structure of a sphere or spheroid immersed in shear flows in the Stoke's regime.</i> <b>Longhua Zhao*</b> , <b>Roberto Camassa</b> and <b>Richard M. McLaughlin</b> , University of North Carolina at Chapel Hill (1056-76-961)	

### **AMS Session on Research by Undergraduates, I**

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8:00 AM – 10:55 AM		Room 3018, 3rd Floor, Moscone
8:00AM ► (1538)		<i>Efficient computation of failure probabilities in optical fiber communication systems.</i> <b>Zachary Marzec*</b> , Jonathan Schuster, SUNY at Buffalo, Lucas Bunt and Benjamin Kanouse, Buffalo State College (1056-78-1698)
8:15AM ► (1539)	<i>Computer Model of Gravitational Lensing Systems.</i> <b>Philip S Naudus</b> , George Mason University (1056-85-1646)	

## *Saturday, January 16 – Program of the Sessions*

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| 8:30AM<br>► (1540)  | <i>On Property <math>P_1</math> and Spaces of Operators.</i><br>Preliminary report.<br><b>Junsheng Fang, David Larson,</b> Texas A&M University, and <b>Stephen Rowe*</b> , Florida Atlantic University Harriet L. Wilkes Honors College (1056-15-394)                    | 8:15AM<br>► (1551)  | <i>Special Sierpiński Numbers.</i> Preliminary report.<br><b>Gregory P. Dresden, Carrie E. Finch*</b> , Washington & Lee University, <b>Josh Harrington</b> , University of South Carolina, <b>Lenny K. Jones</b> , Shippensburg University, and <b>Mark R. Kozek</b> , Whittier College (1056-11-1297) |
| 8:45AM<br>► (1541)  | <i>m-Refinably Extendable Functions.</i><br>Preliminary report.<br><b>John R Meuser</b> , Illinois Wesleyan University (1056-00-359)  | 8:30AM<br>(1552)    | <i>Explicit bounds for the number of <math>p</math>-core partitions of <math>n</math>.</i><br><b>Byungchan Kim</b> and <b>Jeremy Rouse*</b> , University of Illinois, Urbana-Champaign (1056-11-1235)   |
| 9:00AM<br>► (1542)  | <i>What Moves You: Using Legs for Vehicular Transportation.</i><br><b>Jonathan Graf*</b> , Towson University, <b>Olga Stulov</b> , SUNY New Paltz, and <b>Jim Sochacki</b> , James Madison University (1056-34-334)   | 8:45AM<br>(1553)    | <i>Sifting Limits for Selberg's <math>\Lambda^2 \Lambda^-</math> Sieve.</i><br>Preliminary report.<br><b>C S Franze</b> , Central Michigan University (1056-11-1244)  |
| 9:15AM<br>(1543)    | <i>Modeling, Analysis and Computation of Fluid Structure Interaction Models for Biological Systems.</i><br><b>S. Minerva Venuti*</b> and <b>Padmanabhan Seshaiyer</b> , George Mason University (1056-35-1523)  | 9:00AM              | Break   |
| 9:30AM<br>► (1544)  | <i>Nucleation and Spinodal Decomposition in Ternary-component Alloys.</i> Preliminary report.<br><b>Colleen T Ackermann*</b> , Virginia Polytechnic Institute and State University, and <b>William D Hardesty</b> , University of Maryland Baltimore County (1056-35-321) | 9:15AM<br>► (1554)  | <i>On the sum of the reciprocals of the amicable numbers.</i> Preliminary report.<br><b>Jonathan W. Bayless*</b> , Husson University, and <b>Dominic Klyve</b> , Carthage College (1056-11-790)   |
| 9:45AM<br>► (1545)  | <i>Modeling Phase Separation in Ternary Alloys.</i><br><b>James O'Beirne</b> , George Mason University (1056-35-1186)   | 9:30AM<br>(1555)    | <i>D. Stanton's conjecture on <math>t</math>-core partitions.</i><br><b>Byungchan Kim*</b> , University of Illinois at Urbana-Champaign, and <b>Jeremy Rouse</b> , University of Illinois at Urbana-Champaign (1056-11-1336)  |
| 10:00AM<br>► (1546) | <i>Parameter Estimation in a System of Differential Equations.</i><br><b>Franz William Hamilton</b> , George Mason University (1056-35-1260)  | 9:45AM<br>► (1556)  | <i>Generalizing a Theorem of Sierpiński Using Lucas Sequences.</i> Preliminary report.<br><b>Lenny Jones</b> , Shippensburg University (1056-11-859)  |
| 10:15AM<br>► (1547) | <i>Numerical Modeling and Analysis of Fluid Structure Interaction in Biological Systems.</i> Preliminary report.<br><b>Avis A Foster*</b> , <b>Daniel M Anderson</b> , <b>S. Minerva Venuti</b> and <b>Padmanabhan Seshaiyer</b> , George Mason University (1056-35-1617) | 10:00AM<br>(1557)   | <i>Diophantine Questions and the Adeles.</i><br><b>Thomas J Wright</b> , Johns Hopkins University (1056-11-1383)  |
| 10:30AM<br>► (1548) | <i>Prolonging the effectiveness of transgenic insecticidal crops.</i><br><b>John Bantle*</b> , Aaron Festinger, Hee-Joon Jo and Ryan Klafehn, University at Buffalo (1056-92-1791)  | 10:15AM<br>► (1558) | <i>Diophantine Approximation for Alternate Forms of Continued Fractions.</i><br><b>David E. Molnar</b> , Ridgewood, NJ (1056-37-1508)   |
| 10:45AM<br>► (1549) | <i>Complex dynamics of a single nephron model with tubuloglomerular feedback and a myogenic mechanism.</i><br><b>John Dambra*</b> , University at Buffalo, and <b>Steven Leuthe</b> , Buffalo State College (1056-92-1799)  | 10:30AM<br>(1559)   | <i>The Riemann Hypothesis and the Roots of the Riemann Zeta Function.</i><br><b>Samuel W Gilbert</b> , Vienna, VA (1056-11-48)  |

AMS Session on Number Theory, III

**8:00 AM - 10:40 AM**      **Room 3020,  
3rd Floor, Moscone**

- 8:00AM (1550) *Poincaré Series of Diagonal Polynomials.*  
Preliminary report.  
**Dibyajyoti Deb**, University of Kentucky,  
USA (1056-11-1199)

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

**8:00 AM - 10:55 AM**      **Room 2020,  
2nd Floor, Moscone**

Organizers: **David M. Strong**,  
Pepperdine University

Gilbert Strang,  
Massachusetts Institute of  
Technology

Technology  
**David C. Lay**, University of

## Maryland

## **Program of the Sessions – Saturday, January 16 (cont'd.)**

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| <p>► 8:00AM (1560) <i>Eigenvalues and eigenvectors – helping students see what they do.</i><br/> <b>Melvin A Nyman*</b>, Alma College, <b>John Berry</b>, University of Plymouth (England), <b>Douglas A Lapp</b> and <b>Dennis St. John</b>, Central Michigan University (1056-G1-1640)</p> <p>► 8:20AM (1561) <i>Student-centered linear algebra activities.</i><br/> <b>Gulden Karakok*</b>, UMERC, Umea University, Sweden, and <b>Corinne A. Manogue</b>, Department of Physics, Oregon State University (1056-G1-1868)</p> <p>► 8:40AM (1562) <i>Introducing Linear Algebra to Middle School Students.</i> Preliminary report.<br/> <b>Pamela G Coxson</b>, University of California San Francisco (1056-G1-534)</p> <p>► 9:00AM (1563) <i>Interesting projects while teaching Linear Algebra course.</i><br/> <b>Yun Lu</b>, Kutztown University of PA (1056-G1-822)</p> <p>► 9:20AM (1564) <i>Learning the Language of Linear Algebra: Using Reading Assignments to Immerse Students in Terminology and Ideas.</i><br/> <b>Matt Boelkins</b>, Grand Valley State University (1056-G1-856)</p> <p>► 9:40AM (1565) <i>Three tested ways to empower students to engage in linear algebra.</i><br/> <b>Peg Howland*</b> and <b>Brynya R. Kohler</b>, Utah State University (1056-G1-2000)</p> <p>► 10:00AM (1566) <i>Matrices of Sequences: Recurrence and Computation.</i><br/> <b>Mark Anderson Miller</b>, Marietta College (1056-G1-198)</p> <p>► 10:20AM (1567) <i>Transitioning to a Laguerre Basis.</i><br/> <b>Elyn Rykken*</b>, Muhlenberg College, and <b>Maureen Carroll</b>, University of Scranton (1056-G1-2002)</p> <p>► 10:40AM (1568) <i>Using Quaternions and Rotations Matrices for Rotations in R3.</i><br/> <b>Paul Raymond Bouthellier</b>, University of Pittsburgh-Titusville (1056-G1-237)</p> | <p>► 8:45AM (1572) <i>A 21st century makeover of a classic introductory differential equations course.</i><br/> <b>Anand L. Pardhanani</b>, Earlham College (1056-Z1-1007)</p> <p>► 9:00AM (1573) <i>Recruitment and Retention: Flip Sides of the Same Coin.</i> Preliminary report.<br/> <b>Lisa A Lister</b>, Bloomsburg University (1056-Z1-1385)</p> <p>9:15AM Break.</p> <p>► 9:30AM (1574) <i>Redesigning a Mathematics Course to Meet the Needs of Business Majors.</i> Preliminary report.<br/> <b>Kathleen D. Lopez*</b>, <b>Diane G. Fisher</b>, <b>Michael W. Totaro</b> and <b>Lee E. Price</b>, University of Louisiana at Lafayette (1056-Z1-947)</p> <p>► 9:45AM (1575) <i>Changes in Students' Perceptions about Learning Mathematics in a Redesigned Mathematics Course for Business Majors.</i> Preliminary report.<br/> <b>Diane G Fisher*</b>, <b>Kathleen Lopez</b>, <b>Michael Totaro</b> and <b>Lee Price</b>, University of Louisiana at Lafayette (1056-Z1-888)</p> <p>► 10:00AM (1576) <i>Grading Done Right.</i> Preliminary report.<br/> <b>Dustin D. Keck*</b> and <b>Michael A. Brilleslyper</b>, U.S. Air Force Academy (1056-Z1-1680)</p> <p>► 10:15AM (1577) <i>Wiit<sup>TM</sup> Derivatives: Learning Derivatives Through Competition.</i> Preliminary report.<br/> <b>Keith W. DeGregory*</b>, <b>Aaron C. Elliott</b>, <b>William L. Fehlman II</b> and <b>Alex A. Heidenberg</b>, United States Military Academy at West Point (1056-Z1-904)</p> <p>► 10:30AM (1578) <i>Survivor Math: Using Pop Culture to Enhance Learning Mathematics.</i><br/> <b>Robert E Burks</b>, United States Military Academy (1056-Z1-55)</p> <p>► 10:45AM (1579) <i>Composition Operators on <math>S^2(\mathbb{D})</math>.</i><br/> <b>Katherine Heller</b>, University of Virginia (1056-Z1-643)</p> |
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## **MAA Session on General Contributed Papers, IX**

8:00 AM - 10:55 AM

Room 3000,  
3rd Floor, Moscone

Organizers: **Eric S. Marland**,  
Appalachian State University  
**Daniel J. Curtin**, Northern

- Kentucky University

  - ▶ 8:00AM (1569) *A Summer of Knots.*  
**Alan Alewine**, McKendree University  
(1056-Z1-543)
  - 8:15AM (1570) *Calculus Laboratory: A Companion Course to the Lecture.* Preliminary report.  
**Michael P Saclolo**, St. Edward's University (1056-Z1-1612)
  - ▶ 8:30AM (1571) *Science in the Mathematics Classroom.*  
**George Rublein**, College of William and Mary (1056-Z1-1750)

*MAA Session on Mathematics and Sports, II*

8:00 AM - 10:55 AM

Room 2011,  
2nd Floor, Moscone

Organizer: **Howard L. Penn**, U.S. Naval Academy

- ▶ 8:00AM *Did Humidifying the Baseball Decrease the Number of Homers at Coor's Field?*  
Howard L. Penn, U.S. Naval Academy  
(1056-H5-380)
  - ▶ 8:20AM *A nonlinear approach to modeling success in baseball.*  
Jeff Hamrick\*, Rhodes College, and  
John M. Rasp, Stetson University  
(1056-H5-762)
  - ▶ 8:40AM *Biomechanics of Running and Walking.*  
Anthony Tongen, James Madison  
University (1056-H5-1975)

## **Saturday, January 16 – Program of the Sessions**

- 9:00AM (1583) **Mathematics Awareness Month 2010: Mathematics and Sports.**  
**Douglas Ensley**, Shippensburg University, **Joseph A. Gallian\***, University of Minnesota Duluth, and **Howard Penn**, United States Naval Academy. (1056-H5-374)
  - 9:20AM (1584) **Tigermetrics: Statistical Analysis of the PGA Tour.** Preliminary report.  
**Roland Minton**, Roanoke College (1056-H5-314)
  - 9:40AM (1585) **Creating a Sports Video Game using Mathematical Modeling.**  
**Paul Raymond Bouthellier**, University of Pittsburgh-Titusville (1056-H5-236)
  - 10:00AM (1586) **Introducing some new and already existing statistical studies related to a sports mostly popular in the eastern hemispheres.**  
**Santanu Chakraborty**, University of Texas - Pan American, Edinburg, Texas (1056-H5-81)
  - 10:20AM (1587) **Analysis of a Table Tennis Game: A Teaching Tool.**  
**Reza D. Noubary**, Bloomsburg University (1056-H5-928)
  - 10:40AM (1588) **Exploring NFL Data to Determine "Who is the Greatest of Them All?".** Preliminary report.  
**Jacqueline Brannon Giles**, (1) HCC Central College (2) Texas Southern University (1056-H5-512)

# **MAA Session on Visualization in Mathematics, I**

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|---|------------------|---|
|   |                  | Room 2009,<br>2nd Floor, Moscone  |
|   | Organizers:      | <b>Sarah J. Greenwald</b> ,<br>Appalachian State University<br><b>Walter Whiteley</b> , York<br>University  |
| ► | 8:00AM<br>(1589) | <i>Spatial Visualization for Pre-Service<br/>Teachers.</i><br><b>Lily Moshe</b> , York University, <b>Margaret<br/>Sinclair</b> , Faculty of Education, York<br>University, and <b>Walter Whiteley*</b> , York<br>University (1056-R5-1562) |
| ► | 8:20AM<br>(1590) | <i>Picture This: Making Connections in<br/>3-Space.</i><br><b>Sarah L Mabrouk</b> , Framingham State<br>College (1056-R5-2001)  |
| ► | 8:40AM<br>(1591) | <i>Drawing by hand and machine:<br/>Visualizing solids of revolution.</i><br><b>John W Hoggard</b> , Edinboro University of<br>Pennsylvania (1056-R5-1482)  |
|   | 9:00AM<br>(1592) | <i>Visualizing the Popcorn Box.</i><br><b>Ami Mamolo*</b> , York University, Toronot,<br>and <b>Walter Whiteley</b> , York University<br>(1056-R5-1268)   |
| ► | 9:20AM<br>(1593) | <i>Spatial Visualization: Is There a Gender<br/>Difference?</i><br><b>Terri L. Bennett</b> , Southern CT State<br>University (1056-R5-1256)   |

## **SIAM Minisymposium on New Trends in Mathematical Biology**

- | 8:00 AM - 10:55 AM   |  | Room 2002,<br>2nd Floor, Moscone  |
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| Organizers: <b>Mariel Vazquez</b> , San Francisco State University<br><b>Javier Arsuaga</b> , San Francisco State University |  |   |
| 8:00AM<br>(1594)   |  | <i>Strings, Trees, and RNA Folding.</i><br><b>Christine E Heitsch</b> , Georgia Institute of Technology (1056-92-1911)  |
| 8:30AM<br>(1595)   |  | <i>The Other Half of Our Genome.</i><br><b>Jun S Song</b> , UC San Francisco (1056-92-1133)   |
| 9:00AM<br>(1596)   |  | <i>Topological methods for mapping biological data sets.</i><br><b>Gunnar Erik Carlsson</b> , Stanford University (1056-92-1701)  |
| 9:30AM<br>(1597)   |  | <i>A Multi-type Branching Process Model of Tumor Expansion.</i><br><b>Jasmine Foo*</b> , <b>Kevin Leder</b> and <b>Franziska Michor</b> , Sloan Kettering Institute (1056-92-1728)  |
| 10:00AM<br>► (1598)  |  | <i>Analysis of difference topology experiments on a Protein-DNA complex.</i><br><b>John Luecke*</b> , University of Texas at Austin, <b>Isabel Darcy</b> , University of Iowa, and <b>Mariel Vazquez</b> , San Francisco State University (1056-58-1965)  |
| 10:30AM<br>► (1599)  |  | <i>Fast Protein Dynamics Simulations: Dominant Pathways for Protein Conformational Transitions.</i> Preliminary report.<br><b>Patrice Koehl*</b> , University of California, Davis, <b>Joel Franklin</b> , Reed College, <b>Sebastian Doniach</b> , Stanford University, and <b>Marc Delarue</b> , Institut Pasteur, Paris, France (1056-65-1945) |

### *AMS Session on Group Theory, III*

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| 8:15 AM - 10:55 AM | Room 3022,<br>3rd Floor, Moscone   |
| 8:15AM<br>(1600)   | <i>Fundamental domains for congruence subgroups of <math>SL_2</math> in positive characteristic.</i><br><b>Lisa Carbone</b> , Rutgers University, <b>Leigh Cobbs*</b> , Lebanon Valley College, and <b>Scott Murray</b> , University of Sydney (1056-22-203) |
| 8:30AM<br>(1601)   | <i>Homomorphisms on compact subsets of <math>\beta S</math>.</i><br><b>Neil Hindman*</b> , Howard University, and <b>Dona Strauss</b> , University of Leeds (1056-22-311)  |
| 8:45AM<br>(1602)   | <i>Whittaker Modules for a Lie Algebra of Block Type.</i><br><b>Bin Wang</b> , Changshu Institute of Technology, Changshu, China, and <b>Xinyun Zhu*</b> , University of Texas of Permian Basin (1056-22-348)  |

## **Program of the Sessions – Saturday, January 16 (cont'd.)**



*AWM Workshop*

**8:20 AM - 4:30 PM**      **Room 2007,  
2nd Floor, Moscone**

*This session has several parts that will be listed separately by time in this program. All presentations are open to all JMM participants.*

AMS Special Session on Permutations, I

**8:30 AM - 10:50 AM**      **Room 3001,  
3rd Floor, Moscone**

Organizers: **Persi Diaconis**, Stanford University  
**Ira M. Gessel**, Brandeis University  
**Richard P. Stanley**, Massachusetts Institute of Technology

8:30AM *Flag descents and P-partitions.*  
(1611) **Ira M. Gessel**, Brandeis University  
(1056-05-1512)

***MAA Session on General Contributed Papers,  
XI***

**8:30 AM - 10:25 AM**      **Room 3002,  
3rd Floor, Moscone**

Organizers: **Eric S. Marland**,  
Appalachian State University  
**Daniel J. Curtin**, Northern  
Kentucky University

**8:30AM** *Mathematics and English: A Joint Venture.*  
**(1616)** **Amanda I Beecher\***, **Hilary DeRemigio**  
and **Gerald Kobylski**, United States  
Military Academy at West Point  
(1056-Z1-876)

8:45AM (1617) *Geometric Transformations in Design and Their Self-assembling and Self-organizing Structures.*  
**Fatma Mete**, Cornell University  
(1056-ZJ-1837)

9:00AM (1618) *An investigation of attribution theory with College Algebra students via Mathematics Attribution Scale (MAS): Implications to Teaching and Learning Undergraduate Mathematics.* Jerry C. Obiekwe, The university of

9:15AM (1619) Akron-Wayne College (1056-Z1-948)  
*Getting pumped for math: An investigation of student motivations.*  
**Fabiana Cardetti\*** and **P. Joseph McKenna**, University of Connecticut  
(1056-Z1-948)

9:30AM (1620) *The Mathematicians Roll With GEAR-UP.*  
Preliminary report.  
**Edward D Smith**, Pima Community  
Coll., (1056-71-1204)

9:45AM (1621) *Mentoring Underrepresented Students in Science and Mathematics.* Preliminary report.  
**Rebekah Dupont**, Augsburg College (1056-Z1-1687)

## **Saturday, January 16 – Program of the Sessions**

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| <p>10:00AM<br/>► (1622) <i>Over 20 Years of Success in the Emerging Ethnic Engineers Program at the University of Cincinnati.</i><br/><b>Joy Moore*</b> and <b>Kenneth Simonson</b>, University of Cincinnati (1056-Z1-1986)</p> <p>10:15AM<br/>► (1623) <i>A Comparative Study of Online and Traditional Classroom Learning of College Algebra for Non-Traditional Students in Non-Traditional Higher Education Programs.</i><br/><b>Darcel H Ford</b>, Strayer University (1056-Z1-1924)</p>   | <p>9:00AM<br/>► (1629) <i>Utilizing Web-based Statistical Resources in Teaching Nontraditional Undergraduate Students in Online Learning Environments.</i><br/><b>Michael D. Miner</b>, American Public University System (1056-Z1-1896)</p> <p>9:15AM<br/>► (1630) <i>Using Authentic Discovery Projects to Improve Student Outcomes in Statistics.</i><br/>Preliminary report.<br/><b>Dianna J Spence*</b>, <b>A. Robb Sinn</b> and <b>Brad Bailey</b>, North Georgia College &amp; State University (1056-Z1-734)</p> <p>9:30AM<br/>► (1631) <i>The Extended Law of Total Probability.</i><br/>Preliminary report.<br/><b>Zengxiang Tong*</b> and <b>Zhen Huang</b>, Otterbein College (1056-Z1-351)</p> <p>9:45AM<br/>► (1632) <i>Integrating Mathematical Modeling into Science and Mathematics Curricula in Challenged School Districts.</i><br/><b>Mollie R. Jones</b>, Immaculata University (1056-Z1-797)</p> <p>10:00AM<br/>► (1633) <i>A Transition Course From Advanced Placement to College Calculus.</i><br/><b>Timothy A Lucas*</b>, Pepperdine University, and <b>Joseph Spivey</b>, Wofford College (1056-Z1-1107)</p> <p>10:15AM<br/>► (1634) <i>Does Peer Assessment Help Improve Mathematical Writing for Pre-Service Elementary and Middle School Teachers?</i><br/><b>Cheryl Beaver</b> and <b>Scott Beaver*</b>, Western Oregon University (1056-Z1-1502)</p> <p>10:30AM<br/>► (1635) <i>A Taxonomic Analysis of Standard Calculus Tasks: Bloom in Calculus Education.</i><br/>Preliminary report.<br/><b>Gizem Karaali</b>, Pomona College (1056-Z1-25)</p> |
| <p><b>AWM Workshop: Research Presentations by Recent Ph.D.'s, I</b></p> <hr/> <p><b>8:30 AM – 10:20 AM</b></p> <p style="text-align: center;"><b>Room 2007,<br/>2nd Floor, Moscone</b></p> <p>8:30AM<br/>(1624) <i>Families over special base manifolds and a conjecture of Campana.</i><br/><b>Kelly Jabbusch*</b> and <b>Stefan Kebekus</b>, University of Freiburg (1056-14-169)</p> <p>9:00AM<br/>(1625) <i>Shift Automorphism Varieties Are Not Residually Finite.</i><br/><b>Kate S Owens</b>, College Station, TX (1056-08-213)</p> <p>9:30AM<br/>(1626) <i>Oscillation Criteria for Second Order Linear Delay Dynamic Equations.</i><br/>Preliminary report.<br/><b>Raegan Higgins</b>, Texas Tech University (1056-39-118)</p> <p>10:00AM<br/>(1627) <i>An obstruction to slicing iterated Bing doubles.</i><br/><b>Cornelia A. Van Cott</b>, University of San Francisco (1056-57-216)</p> |   |

## ***AMS Committee on Education Panel Discussion***

- 8:30 AM - 10:00 AM**      **Room 3014,  
3rd Floor, Moscone**

*The common core State Standards: Will  
they become our national K-12 math  
curriculum?*

Moderator: **Lawrence Gray**, University  
of Minnesota

## *MAA Session on General Contributed Papers, X*



AMS Invited Address

- 9:00 AM - 9:50 AM**      **Main Lecture Room,  
2nd Floor, Moscone**

(1636) *Evolution problem in General Relativity.*  
**Igor Y. Rodnianski**, Princeton University  
(1056-83-7)

ASL Invited Address



MAA Minicourse #10: Part B

- 9:00 AM - 11:00 AM**      **Pacific J., Marriott  
San Francisco**

*The hitchhiker's guide to mathematics.*

Organizers: **Dan Kalman**, American  
University

## **Program of the Sessions – Saturday, January 16 (cont'd.)**

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**Bruce F. Torrence,**  
Randolph Macon College

### **MAA Minicourse #3: Part B**

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**9:00 AM – 11:00 AM**                   **Pacific H,**  
   Marriott San Francisco  
*Educating about the state of the planet  
and sustainability while enhancing  
calculus.*  
Organizer: **Thomas J. Pfaff**, Ithaca  
College

### **MAA Minicourse #8: Part B**

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**9:00 AM – 11:00 AM**                   **Pacific I, Marriott**  
   San Francisco  
*The Fibonacci and Catalan numbers.*  
Organizer: **Ralph Grimaldi**,  
Rose-Hulman Institute of  
Technology

### **Student Hospitality Center**

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**9:00 AM – 2:00 PM**                   **South Lobby,**  
   2nd Floor, Moscone

### **MAA Committee for the Teaching of Undergraduate Mathematics Panel Discussion**

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**9:00 AM – 10:20 AM**                   **Room 3004,**  
   3rd Floor, Moscone

*Beyond grading and tutoring: New  
approaches to students helping students.*

Organizers: **Daniel E. Flath**, Macalester  
College

**Lewis D. Ludwig**, Denison  
University

**Steven R. Benson**, Lesley  
University

Panelists: **Sonny Painter**, University of  
Missouri-Kansas City

**Karen Saxe**, Macalester  
College

**Catherine A. Beneteau**,  
University of South Florida

### **NAM Panel Discussion**

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**9:00 AM – 9:50 AM**                   **Room 2008,**  
   2nd Floor, Moscone

### **Exhibits and Book Sales**

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**9:00 AM – NOON**                   **Exhibit Hall, Moscone**

### **Employment Center**

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**9:00 AM – NOON**                   **Exhibit Hall, Moscone**

### **AMS Session on Real and Special Functions**

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**9:15 AM – 10:55 AM**                   **Room 3010,**  
   3rd Floor, Moscone

- 9:15AM (1638) *Solution for nonlinear initial-value problems via orthogonal functions.*  
**Mohsen Razzaghi**, Mississippi State University (1056-33-369)
- 9:30AM (1639) *Resultants of Chebyshev Polynomials.*  
**Jemal Emina Gishe\***, Western Kentucky University, and **Mourad E.H. Ismail**, University of Central Florida (1056-33-899)
- 9:45AM (1640) *Representations of quantum group  $U_q(so(n))$  and  $q$ -orthogonal polynomials.*  
**Alexander Rozenblyum**, New York City College of Technology, CUNY (1056-33-922)
- 10:00AM ▶ (1641) *Subpolynomial and Subexponential Functions.* Preliminary report.  
**Houshang H. Sohrab**, Towson University (1056-26-46)
- 10:15AM (1642) *On the Hilbert Transform of a Measure.*  
**Maxim Zinchenko**, Caltech (1056-26-104)
- 10:30AM ▶ (1643) *Aspects of Stochastic Quasi-Cantoresque Sets.* Preliminary report.  
**Padraig M. McLoughlin\***, Kutztown University of Pennsylvania, and **Christopher R. Krizan**, Auburn University (1056-26-613)
- 10:45AM ▶ (1644) *An analogue of L'Hospital's rule.*  
**J Marshall Ash**, DePaul University (1056-26-1354)

### **ASL Invited Address**

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**10:00 AM – 10:50 AM**                   **Room 2004,**  
   2nd Floor, Moscone

- (1645) *Tukey Reducibility as a Setup for Classifying Mathematical Structures.*  
**Stevo Todorcevic**, Universite Paris 7 - C.N.R.S., and University of Toronto (1056-03-73)

### **NAM Business Meeting**

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**10:00 AM – 10:50 AM**                   **Room 2008,**  
   2nd Floor, Moscone

### **MAA Invited Address**

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**10:05 AM – 10:55 AM**                   **Main Lecture**  
   Room, 2nd Floor, Moscone

- (1646) *Symplectic embeddings and continued fractions.*  
**Dusa McDuff**, Barnard College, Columbia University (1056-A0-5)

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## Saturday, January 16 – Program of the Sessions

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### AWM Workshop: Poster Session with Presentations from Women Graduate Students

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10:30 AM – 11:00 AM	Room 2007, 2nd Floor, Moscone
10:30AM (1647)	<i>Siphons in biochemical reaction systems: an algebraist's point of view.</i> <b>Anne Shiu*</b> and <b>Bernd Sturmfels</b> , University of California Berkeley (1056-13-98)
10:30AM (1648)	<i>Backward-iteration sequences and boundary repelling fixed points in higher dimension.</i> Preliminary report. <b>Olena Ostapyuk</b> , Kansas State University (1056-30-147)
10:30AM (1649)	<i>Invariance and Automorphisms of the Computably Enumerable Sets.</i> <b>Rachel Epstein</b> , University of Chicago (1056-03-159)
10:30AM ▶ (1650)	<i>A bijection between partially directed paths in the symmetric wedge and matchings.</i> <b>Svetlana Poznanović</b> , Texas A&M University (1056-05-162)
10:30AM (1651)	<i>Point Parameter Rings.</i> <b>Chelsea M Walton</b> , University of Michigan (1056-00-164)
10:30AM (1652)	<i>Direct-sum decompositions of modules over rings of infinite Cohen-Macaulay type.</i> <b>Silvia Saccoccia</b> , University of Nebraska-Lincoln (1056-13-180)
10:30AM (1653)	<i>A partial generalization of the Gross-Kohnen-Zagier theorem to higher weight modular forms.</i> <b>Kimberly Hopkins</b> , University of Texas at Austin (1056-11-193)
10:30AM (1654)	<i>The core and the adjoint: a condition for equality.</i> <b>Angela L Kohlhaas</b> , University of Notre Dame (1056-13-196)
10:30AM (1655)	<i>What is a <math>\mathbb{Q}</math> curve?</i> <b>Ekin Ozman</b> , University of Wisconsin-Madison (1056-11-197)
10:30AM (1656)	<i>Ihara Zeta Functions and Some Ramified Covers of Graphs.</i> <b>Beth Malmskog*</b> , Colorado State University, and <b>Michelle Manes</b> , University of Hawaii (1056-05-199)
10:30AM (1657)	<i>The Abelian-Nonabelian Correspondence in Gromov-Witten Theory.</i> <b>Kaisa E Taipale</b> , University of Minnesota (1056-14-212)
10:30AM (1658)	<i>Computable distributive lattices and Heyting algebras.</i> <b>Amy Turlington</b> , University of Connecticut (1056-03-214)
10:30AM ▶ (1659)	<i>The most interesting surface homeomorphisms.</i> <b>Chia-Yen Tsai</b> , University of Illinois at Urbana-Champaign (1056-57-218)

10:30AM (1660)	<i>Toric models of graphs.</i> <b>Weronika J Buczynska</b> , Texas A&M University (1056-14-220)
10:30AM (1661)	<i>On stable states in a coupled energetic model for incompressible nematic elastomers.</i> <b>Andrea Catalina Rubiano</b> , Purdue University (1056-35-235)
10:30AM (1662)	<i>Approximating invariant densities of metastable systems.</i> <b>Cecilia Gonzalez Tokman</b> , University of Maryland (1056-37-977)

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### MAA Business Meeting

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11:10 AM – 11:40 AM	Main Lecture Room, 2nd Floor, Moscone
	Organizer: <b>Martha J. Siegel</b> , Towson University
	Moderator: <b>David M. Bressoud</b> , Macalester College

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### AMS Business Meeting

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11:45 AM – 12:15 PM	Main Lecture Room, 2nd Floor, Moscone
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### NAM Claytor-Woodard Lecture

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1:00 PM – 2:00 PM	Room 2008, 2nd Floor, Moscone
(1663)	<i>The Impact of Periodic Proportional Harvesting Policies on TAC-Regulated Fishery Systems.</i> <b>Abdul-Aziz Yakubu</b> , Howard University (1056-92-1763)

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

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1:00 PM – 5:50 PM	Room 2000, 2nd Floor, Moscone
Organizers: <b>Darren Narayan</b> , Rochester Institute of Technology <b>Bernard Brooks</b> , Rochester Institute of Technology <b>Jacqueline Jensen</b> , Sam Houston State University <b>Carl V. Lutzer</b> , Rochester Institute of Technology <b>Vadim Ponomarenko</b> , San Diego State University <b>Tamas Wiandt</b> , Rochester Institute of Technology	
▶ (1664)	<i>Computer-Created Human-Comprehensible Logic Games.</i> Preliminary report. <b>Corneliu A. Bodea, Arthur Charlesworth, Diana A. Iovan and Andrew D. Jones*</b> , University of Richmond (1056-03-105)

## **Program of the Sessions – Saturday, January 16 (cont'd.)**

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| ► (1665) | <b>The Spread of A Rumor.</b> Preliminary report.<br><b>Nick C Fedewa*</b> , <b>Emily E Krause</b> , <b>Alexandra M Sisson</b> and <b>James R Angelos</b> , Central Michigan University (1056-00-106)  | <b>Sloan Despeaux</b> , Western Carolina University   |
| ► (1666) | <b>Structural Adaptation of Microvascular Networks.</b> Preliminary report.<br><b>Rachel S Nancollas*</b> and <b>Benjamin Y Small</b> , Franklin W. Olin College of Engineering (1056-92-132)  | <b>Euler, Dilog, and Zeta(2).</b><br><b>Dan Kalman*</b> , American University, and <b>Mark McKinzie</b> , St. John Fisher College (1056-01-849)   |
| ► (1667) | <b>The Relative Gain Array of Cayley Graphs.</b><br><b>Sara D. Townsend*</b> , <b>Suzi Gearheart</b> and <b>John Owen</b> , Sam Houston State University (1056-05-134)   | <b>The Genesis of Generating Functions in Abraham De Moivre's Work.</b><br><b>David R Bellhouse</b> , University of Western Ontario (1056-01-278)   |
| ► (1668) | <b>Analysis of the Repackaging of Risk in the Sub-Prime Mortgage Crisis.</b> Preliminary report.<br><b>Angela King*</b> , McGill University, <b>Adam Biesenbach</b> , University of Rochester, and <b>Kuni Natsuki</b> , Brown University (1056-91-138)  | <b>What is a Great Book? A Case Study of Legendre's Éléments de Géométrie (1794) and Playfair's Elements of Geometry (1795).</b><br><b>Amy Ackerberg-Hastings</b> , University of Maryland University College (1056-01-625) |
| ► (1669) | <b>Matroids, Geometry, Symmetry and the 4th Dimension.</b><br><b>Chencong Bao</b> , Lafayette College, <b>Camila Friedman-Gerlicz</b> , Claremont McKenna, <b>Peter McGrath*</b> , Lafayette College, and <b>Jessica Vega</b> , Loyola Marymount (1056-05-146)   | <b>Understanding Early Laplacian Simplifications.</b> Preliminary report.<br><b>Menolly Lysne</b> , Simon Fraser University (1056-01-1072)  |
| ► (1670) | <b>Classical and Virtual Pseudodiagram Theory and New Bounds on the Unknotting Numbers and Genus of Knots.</b><br><b>Allison Henrich</b> , Seattle University, <b>Noël MacNaughton</b> , Williams College, <b>Sneha Narayan</b> , Oliver Peichenik, Oberlin College, and <b>Jennifer Townsend*</b> , Scripps College (1056-57-148) | <b>Maxwell, Poincaré and the Rings of Saturn.</b> Preliminary report.<br><b>Tom Archibald</b> , Simon Fraser University (1056-01-254)   |
| ► (1671) | <b>Excellent Local Rings with Semi-Local Formal Fibers.</b><br><b>R. Karpman*</b> , Scripps College, <b>N. Arnosti</b> , Williams College, <b>C. Leverson</b> , Wellesley College, <b>J. Levinson</b> and <b>S. Loepp</b> , Williams College (1056-13-179)   | <b>The n-body problem in spaces of constant curvature.</b><br><b>Florin N. Diacu</b> , University of Victoria (1056-01-393)   |
| ► (1672) | <b>Time to Failure: A Stochastic Model of the Formation and Development of Abdominal Aortic Aneurysms.</b> Preliminary report.<br><b>Jeremy E Brooks</b> , East Tennessee State University (1056-92-325)   | <b>Italian Mathematics and Mechanics Between the 18th and 19th Centuries.</b><br><b>Sandro Caparrini</b> , Institute for the History and Philosophy of Science and Technology, Toronto ON, Canada (1056-01-1596)            |
| ► (1673) | <b>A Knot or Not a Knot?</b> Preliminary report.<br><b>Karleigh Frederick</b> , <b>Samantha Hilker</b> and <b>Megan Savage*</b> , Sam Houston State University (1056-55-1201)  | <b>Federigo Enriques' Obsession: A Tale from Italian Algebraic Geometry.</b> Preliminary report.<br><b>Donald Babbitt*</b> , UCLA, and <b>Judith Goodstein</b> , Einstein Papers Project, Cal Tech (1056-01-306)            |
|          |  | <b>Pinning Down Outliers: 19th Century Stabs at Exact Probabilities for Rare Events.</b> Preliminary report.<br><b>Byron E. Wall</b> , York University (1056-01-548)  |
|          |  | <b>If Brute Force Does Not Work You Are Not Using Enough: the rise of Numerical Integration in 20th Century Astronomy.</b><br><b>Allan D. G. Olley</b> , University of Toronto - IHPST (1056-01-1124)                       |

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

**1:00 PM - 5:50 PM**      **Room 2010,  
2nd Floor, Moscone**

Organizers: **Craig Fraser**, University of  
Toronto  
**Deborah Kent**, Hillsdale  
College

## **AMS-SIAM Special Session on Applications of Algebraic Geometry, II**

**1:00 PM - 5:50 PM**      **Room 3005,  
3rd Floor, Moscone**

Organizers: **Frank Sottile**, Texas A&M University  
**Luis Garcia-Puente**, Sam Houston State University

## *Saturday, January 16 – Program of the Sessions*

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| ▶   | 1:00PM<br>(1684)   | <i>ArtinProver: a truly hybrid symbolic/numeric global optimization algorithm.</i> Preliminary report.<br><b>Erich Leo Kaltofen*</b> , North Carolina State University, <b>Zhengfeng Yang</b> , East China Normal University, Shanghai, China, and <b>Lihong Zhi</b> , Academy of Mathematics and Systems Science, Beijing, China (1056-14-1157)                            | <b>Linda Allen</b> , Texas Tech University   |
| ▶   | 1:30PM<br>(1685)   | <i>Experimentation at the Frontiers of Reality in Schubert Calculus.</i><br><b>Chris Hillar</b> , MSRI, <b>Luis García-Puente</b> , Sam Houston State University, <b>Abraham Martín del Campo</b> , Texas A&M University, <b>James Ruffo</b> , SUNY Oneonta, <b>Stephen L. Johnson</b> , <b>Zach Teitler*</b> and <b>Frank Sottile</b> , Texas A&M University (1056-14-396) | <b>Timothy D. Comar</b> , Benedictine University   |
| ▶   | 2:00PM<br>(1686)   | <i>Nested canalyzing polynomial dynamical systems.</i> Preliminary report.<br><b>Reinhard Laubenbacher*</b> , Virginia Bioinformatics Institute, and <b>David Murragarra</b> , Virginia Polytechnic Institute and State University (1056-92-1524)   | <b>Sophia Jang</b> , Texas Tech University   |
| ▶   | 2:30PM<br>(1687)   | <i>Computing siphons in biochemical reaction systems.</i><br><b>Anne Shiu*</b> and <b>Bernd Sturmfels</b> , University of California Berkeley (1056-13-2006)  | <b>Lih-Ing Roeger</b> , Texas Tech University  |
| ▶   | 3:00PM<br>(1688)   | <i>A persistence tree-based method for calling peaks in ChIP-seq protein binding analysis.</i><br><b>Valerie Hower*</b> and <b>Lior Pachter</b> , University of California, Berkeley (1056-92-1506)   |  |
| ▶   | 3:30PM<br>(1689)   | <i>Algebraic geometry of Gaussian graphical models.</i><br><b>Seth Sullivant</b> , North Carolina State University (1056-14-1155)   |  |
| ▶   | 4:00PM<br>(1690)   | <i>On a parametrization of positive semidefinite matrices with zeros.</i><br><b>Mathias Drton*</b> , University of Chicago, and <b>Josephine Yu</b> , MSRI, Berkeley, CA (1056-15-1159)   |  |
| ▶   | 4:30PM<br>(1691)   | Discussion<br><i>The convex algebraic geometry of rank minimization.</i><br><b>Pablo A Parrilo</b> , Massachusetts Institute of Technology (1056-90-2136)   |  |
| ▶   | 5:00PM<br>(1692)   | <i>Orbitopes.</i><br><b>Raman Sanyal</b> , UC Berkeley, <b>Frank Sottile</b> , Texas A&M University, and <b>Bernd Sturmfels*</b> , UC Berkeley (1056-14-424)  |  |
| <b>AMS Special Session on Biomathematics: Modeling in Biology, Ecology, and Epidemiology, III</b> |  |   |  |
| ▶   | 1:00 PM - 5:50 PM  | Room 3003,<br>3rd Floor, Moscone  |  |
| ▶   | Organizers: <b>Olcay Akman</b> , Illinois State University | 5:00PM<br>(1701)  | <i>Biological Data Mining and Analysis.</i><br>Preliminary report.<br><b>Alice L. Loth</b> , University of Massachusetts, Dartmouth (1056-92-1834) |

**AMS Special Session on Biomathematics:  
Modeling in Biology, Ecology, and  
Epidemiology, III**

**1:00 PM - 5:50 PM**      **Room 3003,  
3rd Floor, Moscone**

Organizers: **Olcay Akman**, Illinois State University

## Program of the Sessions – Saturday, January 16 (cont'd.)

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| <p>5:30PM (1702) <i>Parameter Estimation and Uncertainty Quantification for an Epidemic Model.</i><br/> <b>Alex Capaldi*</b>, Center for Quantitative Sciences in Biomedicine and Department of Mathematics North Carolina State University, and <b>A. L. Lloyd</b>, Graduate Program in Biomathematics and Department of Mathematics North Carolina State University (1056-92-730)</p> | <p>5:00PM (1711) <i>On quantum foldings.</i> Preliminary report.<br/> <b>Arkady Berenstein</b>, University of Oregon, Eugene, and <b>Jacob Greenstein*</b>, University of California, Riverside (1056-17-1394)</p> |
|   | <p>5:30PM (1712) <i>Colored tangle invariants and quantum <math>sl(2)</math> categorification.</i><br/> <b>Joshua Sussan</b>, University of California Berkeley (1056-16-1509)</p>                                 |

### AMS Special Session on Categorical and Algebraic Methods in Representation Theory, II

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- | 1:00 PM – 5:50 PM  | Room 3009,<br>3rd Floor, Moscone |
|--|----------------------------------|
| Organizers: <b>Jon Brundan</b> , University of Oregon<br><b>Julia Pevtsova</b> , University of Washington<br><b>Eric Friedlander</b> , University of Southern California   |                                  |
| 1:00PM (1703) <i>A problem of Kollar and Larsen on finite linear groups and crepant resolutions.</i><br>Preliminary report.<br><b>Robert M. Guralnick</b> , University of Southern California, and <b>Pham Huu Tiep*</b> , University of Arizona (1056-20-722)       |                                  |
| 1:30PM (1704) <i>Associated variety of simple finite-dimensional modules over classical Lie superalgebras and Kac-Wakimoto conjecture.</i> Preliminary report.<br><b>Vera Serganova</b> , UC Berkeley (1056-16-927)  |                                  |
| 2:00PM (1705) <i>Categorifying quantum groups.</i><br><b>Aaron D Lauda</b> , Columbia University (1056-16-857)   |                                  |
| 2:30PM (1706) <i>On Khovanov-Lauda algebras.</i><br><b>Aaron Lauda</b> , Columbia University, and <b>Monica Vazirani*</b> , UC Davis (1056-05-479)   |                                  |
| 3:00PM (1707) <i>Representations of Khovanov-Lauda-Rouquier algebras and combinatorics of Lyndon words.</i><br><b>Alexander Kleshchev*</b> , University of Oregon, and <b>Arun Ram</b> , University of Melbourne (1056-17-464)                                       |                                  |
| 3:30PM (1708) <i>Categorification via Quiver Varieties.</i><br><b>Anthony Licata*</b> , Stanford, <b>Sabin Cautis</b> , Columbia, and <b>Joel Kamnitzer</b> , University of Toronto (1056-14-524)  |                                  |
| 4:00PM (1709) <i>Blocks in Deligne's category <math>Rep(S_t)</math>.</i><br><b>Victor Ostrik</b> , University of Oregon (1056-20-502)  |                                  |
| 4:30PM (1710) <i>Generalized Trace and Dimension Functions in Ribbon Categories.</i><br><b>Nathan Geer</b> , Utah State University, <b>Jonathan Kujawa*</b> , University of Oklahoma, and <b>Bertrand Patureau-Mirand</b> , Université de Bretagne-Sud (1056-17-238) |                                  |

### AMS Special Session on Differential Galois Theory and Group Representations: A Tribute to Andy Magid, II

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- | 1:00 PM – 5:50 PM  | Room 3007,<br>3rd Floor, Moscone |
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| Organizers: <b>James Carrell</b> , University of British Columbia<br><b>Lourdes Juan</b> , Texas Tech University<br><b>Alex Lubotzky</b> , Hebrew University<br><b>Brian Parshall</b> , University of Virginia<br><b>Marius van der Put</b> , University of Groningen                        |                                  |
| 1:00PM (1713) <i>Iterated Antiderivative Extensions.</i><br>Preliminary report.<br><b>V. Ravi Srinivasan</b> , Rutgers University-Newark (1056-12-429)   |                                  |
| 1:30PM (1714) <i>Some 1- and <math>n</math>-cohomology results for finite and algebraic groups.</i><br><b>Leonard L Scott</b> , The University of Virginia (1056-20-1001)  |                                  |
| 2:00PM (1715) <i>Support varieties and complexity for algebraic, finite, and quantum groups.</i><br>Preliminary report.<br><b>Brian Parshall</b> , University of Virginia (1056-20-861)  |                                  |
| 2:30PM (1716) <i>A Survey On Representation Zeta Functions.</i><br><b>Nir Avni</b> , Harvard University (1056-20-782)  |                                  |
| 3:00PM (1717) <i>Analogies between differential Galois theory and additive Galois structure theory.</i> Preliminary report.<br><b>Ted Chinburg*</b> , University of Pennsylvania, <b>Lourdes Juan</b> , Texas Tech University, and <b>Andy Magid</b> , University of Oklahoma (1056-16-1103) |                                  |
| 3:30PM (1718) <i>On a remarkable formula of Kostant and Macdonald, pattern avoidance and smoothness of Schubert varieties in a generalized flag variety.</i><br><b>Jim Carrell</b> , University of British Columbia (1056-14-1126)   |                                  |
| 4:00PM (1719) <i>Groups defined by arithmetic differential equations.</i><br><b>Alexandru Buium</b> , University of New Mexico (1056-11-384)   |                                  |

## **Saturday, January 16 – Program of the Sessions**

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|------------------|---|------------------|--|
| 4:30PM<br>(1720) | <i>On subgroup induction in group representation and group cohomology.</i><br><b>Eli Aljadeff*</b> and <b>Ehud Meir</b> ,<br>Technion-Israel Institute of Technology<br>(1056-20-592) | 4:30PM<br>(1730) | <i>Distinguished representations of reductive <math>p</math>-adic groups.</i> Preliminary report.<br><b>Fiona Murnaghan</b> , University of Toronto<br>(1056-22-463)                                     |
| 5:00PM<br>(1721) | <i>The Hall index of a subgroup of a free group.</i><br><b>Shmuel Rosset</b> , Mathematics, Tel Aviv University, Israel. (1056-20-1204)   | 5:00PM<br>(1731) | <i>An Integral Formula of Shahidi.</i><br><b>Steven T Spallone</b> , University of Oklahoma (1056-22-829)  |
| 5:30PM<br>(1722) | <i>Some Problems in Galois Theory and Representation Theory.</i> Preliminary report.<br><b>Andy R. Magid</b> , University of Oklahoma<br>(1056-13-1259)                               | 5:30PM<br>(1732) | <i>On the Langlands-Shahidi method for the classical groups in non-zero characteristic and applications.</i><br>Preliminary report.<br><b>Luis Alberto Lomeli</b> , The University of Iowa (1056-22-117) |

# **AMS Special Session on Harmonic Analysis and Representations of Reductive $p$ -adic Groups, II**

- |                  | Room 3011,<br>3rd Floor, Moscone   |
|------------------|--|
| Organizers:      | <b>Robert Doran</b> , Texas Christian University<br><b>Paul Sally</b> , University of Chicago<br><b>Loren Spice</b> , Texas Christian University   |
| 1:00PM<br>(1723) | <i>Tame supercuspidal representations of <math>GL(n)</math> distinguished by orthogonal groups.</i><br><b>Joshua M Lansky*</b> and <b>Jeffrey L Hakim</b> , American University (1056-22-1764)   |
| 1:30PM<br>(1724) | <i>Tamely ramified tori.</i> Preliminary report.<br><b>Jeffrey D Adler*</b> , American University, and <b>Stephen M. DeBacker</b> , University of Michigan (1056-22-1820)  |
| 2:00PM<br>(1725) | <i>On the Heisenberg groups and Weil representations in characteristic 2.</i> Preliminary report.<br><b>Jiu-Kang Yu</b> , Purdue University (1056-22-2018)   |
| 2:30PM<br>(1726) | <i>Revisiting the Local Langlands Correspondence for <math>GL(n, F)</math>, <math>n</math> a prime.</i><br><b>Moshe Adrian</b> , University of Maryland (1056-11-337)  |
| 3:00PM<br>(1727) | <i>Some irreducible representations of <math>SL(2, O)</math>, where <math>O</math> is the integer ring of a <math>p</math>-adic field.</i> Preliminary report.<br><b>Monica Nevins</b> , University of Ottawa, Canada (1056-22-1293)   |
| 3:30PM<br>(1728) | <i>An application of Gamma asymptotic expansions.</i> Preliminary report.<br><b>Ju-Lee Kim</b> , MIT (1056-22-1435)  |
| 4:00PM<br>(1729) | <i>Motivic integration and Harish-Chandra characters.</i> Preliminary report.<br><b>Raf Cluckers</b> , University of Lille, <b>Clifton Cunningham</b> , University of Calgary, <b>Julia Gordon*</b> , University of British Columbia, and <b>Loren Spice</b> , Texas Christian University (1056-22-1046) |

## **AMS Special Session on Integrability of Dynamical Systems and Solitons Equations, II**

- |                    |   | Room 3016,<br>3rd Floor, Moscone  |
|--------------------|---|---|
|                    | Organizers:   | <b>Zhijun Qiao</b> , University of Texas-Pan American<br><b>Taxi Xu</b> , Southern Polytechnic State University<br><b>Wenxiu Ma</b> , University of South Florida |
| 1:00PM<br>(1733)   | <i>Solitons, boundary value problems and a nonlinear method of images.</i>  | <b>Gino Biondini*</b> , SUNY at Buffalo, and <b>Guobiao Hwang</b> , University of Vermont (1056-35-1722)  |
| 1:30PM<br>(1734)   | <i>The exact solutions of Lund-Regge equation and its soliton surfaces.</i><br><b>Chunli Chen</b> , Shanghai Jiao Tong University (1056-35-1498)  |   |
| 2:00PM<br>(1735)   | <i>A Detailed Bifurcation Diagram and Semi-Analytic Solutions of the Forced Korteweg-de Vries Equation.</i>   | <b>Aaron S. Donahue</b> and <b>Samuel S.P. Shen*</b> , San Diego State University (1056-35-725)   |
| 2:30PM<br>(1736)   | <i>Peakons of b-family and Qiao Equations.</i><br>Preliminary report.   | <b>Taxi Xu</b> , Southern Polytechnic State University (1056-35-1606)   |
| 3:00PM<br>(1737)   | <i>On the Lagrangian Description of Discrete Integrable Systems.</i> Preliminary report.  | <b>Anton Dzhamay</b> , University of Northern Colorado (1056-39-1943)   |
| 3:30PM<br>► (1738) | <i>Symmetries and algebras for a MKdV-type equation in (2+1)-dimension.</i><br>Preliminary report.  |   |
| 4:00PM<br>► (1739) | <i>Optical soliton perturbation by He's variational principle.</i>  | <b>Jun Yu</b> , Institute of Nonlinear Science, Shaoxing University (1056-35-686)   |
| 4:30PM<br>(1740)   | <i>A Novel Adaptive Method for SAR Jamming Suppression.</i> Preliminary report.<br><b>Feng Zhou*</b> , Guangcui Sun, Xueru Bai and Mengdao Xing, National key lab for radar signal processing (1056-78-864) |   |

## Program of the Sessions – Saturday, January 16 (cont'd.)

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<p>5:00PM (1741) <i>Study on ISAR imaging of steadily moving targets with large observation angles.</i> Preliminary report. <b>Xueru Bai*</b>, Mengdao Xing, Feng Zhou and Zheng Bao, National Key lab. for radar signal processing (1056-78-708)</p> <p>5:30PM ▶ (1742) <i>PDE Analysis and Cross-Range Imaging of Synthetic Aperture Radar.</i> Preliminary report. <b>Zhijun Qiao*</b>, Jaime Lopez and Guillermo Garza, Univ Texas - Panam (1056-35-765)</p>	<p>5:30PM (1752) <i>Regularity for exact Gabor systems on a lattice.</i> <b>Alexander Powell*</b>, Vanderbilt University, and <b>Christopher Heil</b>, Georgia Institute of Technology (1056-42-1145)</p>
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### AMS Special Session on Optimal Frames and Operator Algebras, II

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1:00 PM – 5:50 PM	Room 2012, 2nd Floor, Moscone
	Organizers: <b>David Larson</b> , Texas A&M University
	<b>Deguang Han</b> , University of Central Florida
	<b>Shidong Li</b> , San Francisco State University
1:00PM (1743) <i>Dual Gramian Analysis and its development.</i> <b>Zuowei Shen</b> , National University of Singapore (1056-41-770)	
1:30PM (1744) <i>Can one hear the shape of a fractal?</i> <b>Dorin Dutkay</b> , University of Central Florida (1056-46-781)	
2:00PM (1745) <i>Irregular Gabor tight frames associated with rough windows.</i> Preliminary report. <b>Jean-Pierre Gabardo</b> , McMaster University (1056-42-819)	
2:30PM (1746) <i>A Quantitative Notion of Redundancy.</i> <b>Peter Casazza</b> , University of Missouri, and <b>Gitta Kutyniok*</b> , University of Osnabrueck (1056-42-854)	
3:00PM (1747) <i>Gabor frames and Strichartz estimates.</i> Preliminary report. <b>Kasso A. Okoudjou</b> , University of Maryland (1056-41-906)	
3:30PM (1748) <i>Function spaces and representations.</i> <b>Gestur Olafsson*</b> , Louisiana State University, and <b>Jens Christensen</b> , University of Maryland and the Norbert Wiener Center (1056-46-1079)	
4:00PM (1749) <i>Perturbations of finite frames and projections.</i> <b>Victor Kaftal*</b> , University of Cincinnati, and <b>David R. Larson</b> , Texas A&M University (1056-47-1084)	
4:30PM (1750) <i>Classification of filter systems giving rise to generalized multiresolution analyses.</i> Preliminary report. <b>Judith A Packer</b> , University of Colorado at Boulder (1056-42-1087)	
5:00PM (1751) <i>Spectral sets for <math>\frac{1}{2n}</math>-Bernoulli convolutions.</i> <b>Keri Kornelson*</b> , University of Oklahoma, <b>Palle Jorgensen</b> , University of Iowa, and <b>Karen Shuman</b> , Grinnell College (1056-47-1091)	

### AMS Special Session on Parabolic Geometries, Integrable Systems, and Twistor Theory, II

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1:00 PM – 5:50 PM	Room 2006, 2nd Floor, Moscone
	Organizers: <b>Dana Mihai</b> , Carnegie Mellon University
	<b>Jonathan Holland</b> , University of Pittsburgh
	<b>George Sparling</b> , University of Pittsburgh
1:00PM (1753) <i>Generic rank two distributions on five-manifolds and associated conformal structures.</i> <b>Katja Sagerschnig</b> , University of Vienna, Austria (1056-53-792)	
1:30PM (1754) <i>Symplectification, Generalized Tanaka Prolongations, and Geometry of Distributions.</i> Preliminary report. <b>Igor Zelenko</b> , Texas A&M University (1056-53-805)	
2:00PM (1755) <i>Local twistors and the conformal field equations.</i> <b>Jörg Frauendiener</b> , University of Otago (1056-53-375)	
3:00PM (1756) <i>Third order odes and conformal Finsler geometries.</i> <b>Jonathan E Holland</b> , University of Pittsburgh (1056-53-593)	
3:30PM (1757) <i>Variational calculus in non-commutative frames.</i> Preliminary report. <b>Irina A Kogan</b> , North Carolina State University (1056-53-551)	
4:00PM ▶ (1758) <i>Non-compact Hopf Maps, Quantum Hall Effect, and Twistor Theory.</i> Preliminary report. <b>Kazuki Hasebe</b> , Takuma National College of Technology (1056-51-696)	
4:30PM (1759) <i>Integrable models and the gauge/string duality.</i> <b>Radu S Roiban</b> , Pennsylvania State University (1056-00-2004)	
5:00PM (1760) <i>The Chern-Moser chains of left-invariant CR structures on <math>SU(2)</math> via Fefferman approach.</i> <b>Alex L Castro*</b> and <b>Richard Montgomery</b> , UCSC (1056-32-654)	
5:30PM (1761) <i>The exceptional Lie group <math>G_2</math> and gravity.</i> <b>George Arthur Sparling</b> , Laboratory of Axiomatics, University of Pittsburgh (1056-53-1661)	

## Saturday, January 16 – Program of the Sessions

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### **AMS Special Session on Permutations, II**

1:00 PM – 5:50 PM	Room 3001, 3rd Floor, Moscone
	Organizers: <b>Persi Diaconis</b> , Stanford University <b>Ira M. Gessel</b> , Brandeis University <b>Richard P. Stanley</b> , Massachusetts Institute of Technology
1:00PM ► (1762)	<i>Permutations associated with random interval partitions.</i> Preliminary report. <b>Jim Pitman</b> , University of California, Berkeley (1056-05-1620)
1:30PM (1763)	<i>n! matchings, n! posets.</i> <b>Anders Claesson</b> *, The Mathematics Institute, School of Computer Science, Reykjavik University, and <b>Svante Linusson</b> , KTH-Royal Institute of Technology (1056-05-1939)
2:00PM ► (1764)	<i>The absence of a given pattern and the number of occurrences of another.</i> <b>Miklos Bona</b> , University of Florida (1056-05-932)
2:30PM (1765)	<i>Extension of the d-divisible partition lattice.</i> <b>Richard Ehrenborg</b> * and <b>JiYoon Jung</b> , University of Kentucky (1056-05-1585)
3:00PM (1766)	<i>Bijective enumeration of permutations starting with a longest increasing subsequence.</i> <b>Greta Panova</b> , Harvard University (1056-05-1077)
3:30PM (1767)	<i>From random permutations to random matrices — an alternative for RSK.</i> <b>Alexei Borodin</b> , California Institute of Technology (1056-05-2152)
4:00PM ► (1768)	<i>Carries and shuffling.</i> <b>Persi Diaconis</b> , Stanford University, and <b>Jason Fulman</b> *, University of Southern California (1056-05-1709)
4:30PM (1769)	<i>Distribution of Segment Lengths in Genome Rearrangements.</i> <b>Glenn P Tesler</b> , University of California, San Diego (1056-05-2013)
5:00PM ► (1770)	<i>Permutation problems.</i> <b>Donald E. Knuth</b> , Stanford University (1056-05-168)
5:30PM (1771)	<i>How to encipher small messages: Encryption using the Thorp shuffle.</i> <b>Ben J Morris</b> *, Phillip Rogaway and Till Stegers, UC Davis (1056-60-1404)

### **MAA Minicourse #1: Part B**

1:00 PM – 3:00 PM	Pacific H, Marriott San Francisco
	Remodeling data analysis. Organizers: <b>Daniel Kaplan</b> , Macalester College <b>Vittorio Addona</b> , Macalester College

### **MAA Minicourse #5: Part B**

1:00 PM – 3:00 PM	Pacific I, Marriott San Francisco
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*Active learning approaches for the foundational mathematics for elementary teachers courses.*

Organizers: **Laurie J. Burton**, Western Oregon University  
**Cheryl Beaver**, Western Oregon University  
**Klay Thomas Kruczak**, Western Oregon University

### **AMS Session on Geometry and Topology, IV**

1:00 PM – 5:25 PM	Room 3012, 3rd Floor, Moscone
1:00PM (1772)	<i>Weak Solutions to a Degenerate Monge-Ampère Type Equation on Kähler Surfaces.</i> <b>Arvind S. Rao</b> , University of Iowa (1056-53-187)
1:15PM (1773)	<i>Low dimensional cohomogeneity one manifolds.</i> <b>Corey A. Hoelscher</b> , Rutgers University (1056-53-509)
1:30PM ► (1774)	<i>Duality Properties of Indicatrices of Knots.</i> <b>Charmaine Sia</b> , Massachusetts Institute of Technology (1056-53-566)
1:45PM (1775)	<i>Volume of Meromorphic Vector fields on Flat Tori.</i> Preliminary report. <b>Amine Fawaz</b> , The University of Texas at the Permian Basin (1056-53-728)
2:00PM (1776)	<i>Symmetric Almost r-Paracontact Connections.</i> Preliminary report. <b>Andrew Bucki</b> , Langston University (1056-53-1127)
2:15PM	Break
2:30PM (1777)	<i>Singular reduction of generalized complex manifolds.</i> <b>Timothy E Goldberg</b> , Cornell University (1056-53-1467)
2:45PM (1778)	<i>Behavior of the Chern-Simons forms under the Ricci flow.</i> <b>Christopher R Godbout</b> , Lehigh University (1056-53-1720)
3:00PM (1779)	<i>Curvature-adapted hypersurfaces of 2-type in quaternion space forms.</i> <b>Ivko M Dimitric</b> , Penn State University Fayette (1056-53-1752)
3:15PM (1780)	<i>Uniqueness of folded symplectic toric manifolds.</i> Preliminary report. <b>Christopher R Lee</b> , University of Portland (1056-53-2066)
3:30PM (1781)	<i>Characteristics of a Classical and Quantum Two-Sphere Singularity.</i> <b>Deborah A. Konkowski</b> *, U. S. Naval Academy, and <b>Thomas M. Helliwell</b> , Harvey Mudd College (1056-83-884)
3:45PM	Break

## Program of the Sessions – Saturday, January 16 (cont'd.)

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4:00PM (1782)	<i>Local uniqueness of Minkowski space.</i> <b>Didier A. Solis*</b> and <b>Luis A. Farfan</b> , Universidad Autonoma de Yucatan (1056-83-1577)	2:00PM ► (1792)	<i>The game chromatic index of trees.</i> <b>Charles Dunn</b> , Linfield College, <b>David Morawski*</b> , University of California, Berkeley, and <b>Jennifer Nordstrom</b> , Linfield College (1056-00-435)
4:15PM (1783)	<i>A spectral notion of Gromov-Wasserstein distances.</i> <b>Facundo Memoli</b> , Stanford University, Mathematics (1056-68-440)	2:15PM (1793)	<i>Moduli spaces of low dimensional associative algebras and their deformations.</i> <b>Daniel Joseph Wackwitz*</b> and <b>Michael Robert Penkava</b> , University of Wisconsin-Eau Claire (1056-16-1344)
4:30PM (1784)	<i>A Mathematical Theory of Stochastic Microlensing.</i> <b>Alberto M Teguia*</b> , <b>Arlie O. Petters</b> , Duke University, and <b>Brian Rider</b> , University of Colorado (1056-83-1767)	2:30PM ► (1794)	<i>Proving Summation Identities: The WZ Method versus Counting.</i> <b>Timothy D. Ferdinands</b> , Calvin College & Grand Valley State University REU (1056-05-1545)
4:45PM (1785)	<i>Geometric properties of continued fractions.</i> <b>Avraham Bourla</b> , University of Connecticut at Storrs (1056-52-595)	2:45PM ► (1795)	<i>An elementary proof of Touchard's Congruence.</i> <b>Gregory B Hurst</b> , University of Illinois at Urbana (1056-05-992)
5:00PM (1786)	<i>A new argument for the exactness at the <math>(n+1)</math>-thickening term in the C.T.C Wall's exact sequence for thickenings.</i> <b>Mokhtar B. Aouina</b> , Jackson State University (1056-55-1671)	3:00PM ► (1796)	<i>Competitive Graph Coloring on Outerplanar Graphs.</i> Preliminary report. <b>Cassandra Naymie*</b> , University of Waterloo, <b>Charlie Suer</b> , University of Dayton, and <b>Erin Pitney</b> , Beaverton School District (1056-05-1330)
5:15PM ► (1787)	<i>Resolvable maps preserve complete metrizability.</i> <b>Su Gao</b> and <b>Vincent Kieftenbeld*</b> , University of North Texas (1056-54-408)	3:15PM (1797)	<i>On <math>\lambda</math>-fold Rosa-type Labelings.</i> <b>Jeffrey Mudrock*</b> , University of Illinois, Champaign-Urbana, <b>Lucas Allen</b> , Morton High School, <b>Ryan Bunge</b> , Normal Community High School, <b>Saad El-Zanati</b> , <b>Daniel Gannon</b> , <b>Kyle Knee</b> , Illinois State University, and <b>Jessica Smith</b> , Morehead State University (1056-05-1749)

### AMS Session on Research by Undergraduates, II

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1:00 PM – 5:55 PM	Room 3018, 3rd Floor, Moscone
1:00PM (1788)	<i>The Fractal Beauty of Byzantine Music.</i> <b>Firas Y Hindeleh</b> and <b>Jessica R Sears*</b> , Grand Valley State University (1056-37-717)
1:15PM ► (1789)	<i>Manifolds with Density as Quotients of Riemannian Manifolds.</i> <b>Alexander Diaz</b> , Universidad de Puerto Rico, Mayaguez, <b>Nathan Harman*</b> , University of Massachusetts, Amherst, <b>Sean Howe</b> , University of Arizona, and <b>David Thompson</b> , Williams College (1056-53-101)
1:30PM ► (1790)	<i>Isoperimetric Regions in Planar Sectors with Density <math>r^p</math>.</i> <b>Alexander Diaz</b> , University of Puerto Rico, <b>Nate Harman</b> , University of Massachusetts - Amherst, <b>Sean P Howe*</b> , University of Arizona, and <b>David Thompson</b> , Williams College (1056-53-100)
1:45PM ► (1791)	<i>The Spherical Stick Index and Compositions of Trefoils.</i> <b>Colin Adams</b> , Williams College, <b>Dan Collins*</b> , Cornell University, <b>Katherine Hawkins</b> , Williams College, <b>Charmaine Sia</b> , Massachusetts Institute of Technology, <b>Rob Silversmith</b> , Williams College, and <b>Bena Tshishiku</b> , Washington and Lee University (1056-57-546)
2:00PM ► (1792)	<i>The game chromatic index of trees.</i> <b>Charles Dunn</b> , Linfield College, <b>David Morawski*</b> , University of California, Berkeley, and <b>Jennifer Nordstrom</b> , Linfield College (1056-00-435)
2:15PM (1793)	<i>Moduli spaces of low dimensional associative algebras and their deformations.</i> <b>Daniel Joseph Wackwitz*</b> and <b>Michael Robert Penkava</b> , University of Wisconsin-Eau Claire (1056-16-1344)
2:30PM ► (1794)	<i>Proving Summation Identities: The WZ Method versus Counting.</i> <b>Timothy D. Ferdinands</b> , Calvin College & Grand Valley State University REU (1056-05-1545)
2:45PM ► (1795)	<i>An elementary proof of Touchard's Congruence.</i> <b>Gregory B Hurst</b> , University of Illinois at Urbana (1056-05-992)
3:00PM ► (1796)	<i>Competitive Graph Coloring on Outerplanar Graphs.</i> Preliminary report. <b>Cassandra Naymie*</b> , University of Waterloo, <b>Charlie Suer</b> , University of Dayton, and <b>Erin Pitney</b> , Beaverton School District (1056-05-1330)
3:15PM (1797)	<i>On <math>\lambda</math>-fold Rosa-type Labelings.</i> <b>Jeffrey Mudrock*</b> , University of Illinois, Champaign-Urbana, <b>Lucas Allen</b> , Morton High School, <b>Ryan Bunge</b> , Normal Community High School, <b>Saad El-Zanati</b> , <b>Daniel Gannon</b> , <b>Kyle Knee</b> , Illinois State University, and <b>Jessica Smith</b> , Morehead State University (1056-05-1749)
3:30PM ► (1798)	<i>On Cyclic Cycle Plus a Chord Designs.</i> <b>Desiree Masters*</b> , Dunlap High School, <b>Ryan Bunge</b> , Normal Community High School, <b>Saad El-Zanati</b> , Illinois State University, <b>Theresa Kamykowski</b> , Loyola University, Chicago, and <b>Isai Almeida-Arrieta</b> , Western Michigan University (1056-05-1775)
3:45PM ► (1799)	<i>Minimal Sufficient Sets and the Commutativity of Patterns.</i> <b>Zhexiu Tu*</b> , Bard College, and <b>Olivia Walsh</b> , College of William and Mary (1056-15-1428)
4:00PM (1800)	<i>Inverse Inertia Problem for Graphs.</i> <b>Emily McHenry*</b> , Xavier University, and <b>Robert Lang</b> , Florida Atlantic University (1056-15-355)
4:15PM (1801)	<i>Sudoku, Shidoku, and . . . Gröbner Bases? An Algebraic and Computer Systems Approach to Counting Equivalent Puzzles.</i> Preliminary report. <b>Matthew J. Menickelly*</b> and <b>Katharina M. Carella</b> , James Madison University (1056-14-1419)
4:30PM ► (1802)	<i>Galois groups via Galois modules in Artin-Schreier theory.</i> Preliminary report. <b>Jennifer S Berg</b> , University of Illinois at Urbana-Champaign (1056-12-1534)
4:45PM	Break

## *Saturday, January 16 – Program of the Sessions*

*AMS Session on Discrete Mathematics, VI*

		Room 3010, 3rd Floor, Moscone
1:00PM (1807)	<i>Characterizing linear programming pseudocodewords using graphical methods.</i> <b>Nathan Axvig</b> , University of Nebraska-Lincoln (1056-05-1281)	
1:15PM (1808)	<i>Forbidden Subgraphs in Oriented Line Graphs.</i> <b>Elizabeth Moseman*</b> , USMA at West Point, and <b>Chris Storm</b> , Adelphi University (1056-05-1315)	
1:30PM (1809)	<i>Some Results On <math>\lambda</math>-Designs With Two Block Sizes.</i> Preliminary report. <b>Tariq Akef Alraqad*</b> , Northern State University, and <b>Mohan Shrikhande</b> , Central Michigan University (1056-05-1319)	
1:45PM ► (1810)	<i>Using Analysis of Algorithms to Derive Combinatorial Equalities.</i> <b>Amy Mihnea</b> , Florida Atlantic University (1056-05-1377)	
2:00PM (1811)	<i>Minimal Percolating Sets in Trees.</i> <b>Eric Riedl</b> , University of Notre Dame (1056-05-1386)	
2:15PM ► (1812)	<i>Intermediate Ordered Colorings of Graphs.</i> <b>Darren A Narayan</b> , Rochester Institute of Technology (1056-05-1139)	
2:30PM ► (1813)	<i>Spectra of Coronae.</i> <b>C McLeman</b> and <b>E M McNicholas*</b> , Willamette University (1056-05-1391)	
2:45PM (1814)	<i>The Excess Range of Factorizations of Regular Graphs.</i> Preliminary report. <b>Sarah-Marie Belcastro*</b> and <b>Michael Young</b> , Smith College (1056-05-1478)	

*AMS Session on Optimization and Control*

1:00 PM - 5:25 PM	Room 3022, 3rd Floor, Moscone
1:00PM (1822)	<i>Generalized Steiner and Schwarz Symmetrization.</i> <b>Frank Morgan*</b> , Williams College, Alexander Diaz, University of Puerto Rico, Nate Harman, University of Massachusetts, Amherst, Sean Howe, University of Arizona, and David Thompson, Williams College (1056-49-401)
1:15PM (1823)	<i>Higher Order Sufficient Conditions for Strict Minimality in Smooth Scalar Optimization.</i> <b>Elena Constantin</b> , University of Pittsburgh at Johnstown (1056-49-1049)
1:30PM (1824)	<i>The asymptotic behavior of power-law functionals and applications.</i> <b>Cristina Popovici</b> , NDSU (1056-49-1104)
1:45PM (1825)	<i>On the Principle of Smooth Fit for Some Convex Optimal Control Problems.</i> <b>Jesus A. Pascal</b> , American University of Nigeria (1056-49-1194)

## Program of the Sessions – Saturday, January 16 (cont'd.)

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2:00PM ► (1826)	<i>Optimal Control and its Application to Hepatitis C Treatment.</i> <b>Siddartha P. Chakrabarty</b> , Indian Institute of Technology Guwahati, India, and <b>Hem R Joshi*</b> , Xavier University, Cincinnati OH (1056-49-1645)	5:00PM (1836)	<i>Production Inventory Planning in a Stochastic Manufacturing System with Discounted Cost.</i> <b>Anton Abdulbasah Kamil*</b> and <b>Md Azizul Baten</b> , Universiti Sains Malaysia (1056-90-176)
2:15PM	Break	5:15PM (1837)	<i>Relaxed Matching for the Method of Controlled Lagrangians.</i> <b>David A Long*</b> , North Carolina State University, <b>Anthony M Bloch</b> , University of Michigan, <b>Jerrold E Marsden</b> , California Institute of Technology, and <b>Dmitry V Zenkov</b> , North Carolina State University (1056-70-1372)
2:30PM ► (1827)	<i>Application of Nonlinear Optimization in the Design of a Doubly Convergent Multiple-Beam Electron Gun.</i> <b>Adam Attarian*</b> , Tallis J William, <b>Hien T Tran</b> , North Carolina State University, and <b>Lawrence Ives</b> , Calabazas Creek Research, Inc. (1056-49-1654)		
2:45PM (1828)	<i>The Minimal Time Problem On Stratified Domains.</i> <b>Richard C Barnard*</b> and <b>Peter R Wolenski</b> , Louisiana State University (1056-49-1675)		
3:00PM (1829)	<i>Analysis of Tendon-Reinforced Piecewise-Isotropic Pressurized Membranes.</i> <b>Michael C. Barg*</b> , Niagara University, <b>Jieun Lee</b> and <b>Frank Baginski</b> , The George Washington University (1056-49-1690)		
3:15PM ► (1830)	<i>Sensitivity-Based Optimization Applied to Equations Modeling Film Casting.</i> <b>David C Szurley</b> , Francis Marion University (1056-49-1702)		
3:30PM (1831)	<i>Morrey Regularity for Asymptotically Convex Variational Problems with <math>(p, q)</math> Growth.</i> <b>Kyle Fey*</b> and <b>Mikil Foss</b> , University of Nebraska - Lincoln (1056-49-1850)		
3:45PM (1832)	<i>A Modified Piecewise Constant Mumford-Shah Model Based Simultaneous Image Segmentation and Registration.</i> Preliminary report. <b>Jung-Ha An*</b> , California State University Stanislaus, and <b>Yunmei Chen</b> , University of Florida (1056-49-1967)		
4:00PM	Break		
4:15PM (1833)	<i>Generalized shearlets and the extended metaplectic group.</i> <b>Emily J King*</b> , National Institutes of Health / Norbert Wiener Center UMD, and <b>Wojciech Czaja</b> , University of Maryland (1056-43-1718)		
4:30PM ► (1834)	<i>Remarks on the Apportionment of the U.S. House of Representatives.</i> Preliminary report. <b>Daniel D Sheng*</b> , Westwood High School, and <b>Edwin Oxford</b> , Baylor University (1056-00-511)		
4:45PM (1835)	<i>An Estimate of The Radius of an Attraction Ball for TV-Minimization Problems in Image Denoising.</i> <b>L. A. Melara*</b> , Shippensburg University, and <b>A. J. Kearsley</b> , NIST (1056-90-1776)		

## AMS Session on Computational Math, IV

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1:00 PM – 2:40 PM	Room 3014, 3rd Floor, Moscone
1:00PM (1838)	<i>Optimization in Developing Prediction Scoring Function for Mutagenesis Solubility.</i> <b>Ye (Alice) Tian</b> , Washington State University (1056-90-2129)
1:15PM ► (1839)	<i>Applications of Ensemble based Simulated Annealing to Intensity Modulated Radiation Therapy Planning(IMRT). Preliminary report.</i> <b>Abebaw Tadesse*</b> and <b>Franklin Fondjo Fotou</b> , Langston University (1056-90-608)
1:30PM (1840)	<i>Multiresolution Shannon-type wavelet on the Heisenberg group.</i> <b>Azita Mayeli</b> , City University of New York (1056-43-755)
1:45PM (1841)	<i>Equivalence of Curves Under Generalized Weak Perspective Projection.</i> <b>Joseph M Burdis*</b> and <b>Irina A Kogan</b> , North Carolina State University (1056-00-626)
2:00PM ► (1842)	<i>Extraction of Transport Coefficients in Stochastic Production Systems.</i> <b>Ali Kemal Unver</b> , Coral Academy of Science Las Vegas (1056-90-1745)
2:15PM (1843)	<i>Closure of a Saint Venant model for free surface flows on an open channel with cross stream variation of the bottom roughness.</i> <b>Ahmed Kaffel*</b> , Virginia Tech, <b>Amel Soualmia</b> , LMHE, and <b>Masbernat Lucien</b> , IMFT (1056-70-1432)
2:30PM ► (1844)	<i>Modeling Network Traffic as a Filtered Semi-Markov-Process.</i> Preliminary report. <b>Ahlam E Tannouri*</b> and <b>Sam F Tannouri</b> , Morgan State University (1056-90-2041)

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

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1:00 PM – 5:15 PM	Room 2022, 2nd Floor, Moscone
	Organizers: <b>David M. Strong</b> , Pepperdine University

## Saturday, January 16 – Program of the Sessions

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<p><b>Gilbert Strang,</b> Massachusetts Institute of Technology</p> <p><b>David C. Lay,</b> University of Maryland</p> <p>1:00PM (1845) <i>Linear Algebra Done Right! Back to Grassmann.</i> <b>K. Rohan Attele*</b>, Dan Hrozencik and Victor Akatsa, Chicago State University (1056-G1-2056)</p> <p>1:20PM (1846) <i>One course to serve them all: mathematicians, computer scientists, and engineers.</i> <b>David Mazur</b>, Western New England College (1056-G1-1707)</p> <p>1:40PM ▶ (1847) <i>Learning technology to teach mathematics.</i> <b>Josep Ferrer*</b>, Universitat Politècnica de Catalunya, Carmen Ortiz, Universidad de Extremadura, and Marta Pena, Universitat Politècnica de Catalunya (1056-G1-600)</p> <p>2:00PM ▶ (1848) <i>Use of Technology in Teaching the Mathematics of Linear Algebra.</i> Preliminary report. <b>Carl C. Cowen</b>, IUPUI (1056-G1-587)</p> <p>2:20PM ▶ (1849) <i>ICT Linear algebra class model with Sage-math.</i> <b>Sang-Gu Lee*</b> and Duk-Sun Kim, Sungkyunkwan University (1056-G1-1131)</p> <p>2:40PM ▶ (1850) <i>Enhancing Students' Attitudes towards Linear Algebra with Technology.</i> <b>Karsten Schmidt</b>, Schmalkalden University of Applied Sciences, Germany (1056-G1-378)</p> <p>3:00PM ▶ (1851) <i>Programming Linear Algebra.</i> <b>Daniel R. Jordan</b>, Columbia College Chicago (1056-G1-1380)</p> <p>3:20PM ▶ (1852) <i>Looking at Conceptual Online Linear Algebra applets.</i> <b>David E. Meel</b>, Bowling Green State University (1056-G1-1931)</p> <p>3:40PM ▶ (1853) <i>Matrix Multiplication and Applications: A Chicken and Egg Problem.</i> <b>Murphy Waggoner</b>, Simpson College (1056-G1-411)</p> <p>4:00PM ▶ (1854) <i>Inverses for Matrices that Don't Have Inverses.</i> <b>Jeffrey L Stuart</b>, Pacific Lutheran University (1056-G1-958)</p> <p>4:20PM ▶ (1855) <i>Inclusion of new applications in a Linear Algebra course, without compromising the coverage of the traditional topics.</i> <b>Mohammad Khadivi</b>, Jackson State University (1056-G1-970)</p> <p>4:40PM ▶ (1856) <i>Using Linear Algebra to Measure Power.</i> <b>Jennifer Wilson*</b>, Eugene Lang College the New School for Liberal Arts, Karrolyne Fogel, California Lutheran University, Kay Somers, Moravian College, and Angela Spalsbury, Youngstown State University (1056-G1-1528)</p>	<p>5:00PM ▶ (1857) <i>Applying Image Processing Techniques to Promote Conceptual Understanding in Linear Algebra Classes.</i> Preliminary report. <b>Jen-Mei Chang*</b> and Xuhui Li, California State University, Long Beach (1056-G1-111)</p>
<b>MAA Session on Arts and Mathematics, II</b>	
<p>1:00 PM – 5:35 PM</p>	<p>Room 2011, 2nd Floor, Moscone</p>
<p>Organizer: <b>Douglas E. Norton</b>, Villanova University</p> <p>1:00PM ▶ (1858) <i>Material Properties of hyperbolic space in relation to history of clothing.</i> Preliminary report. <b>Rebecca E Field</b>, James Madison University (1056-C1-2131)</p> <p>1:20PM ▶ (1859) <i>Symmetry Preference and Meaning in Tibetan Sand Mandalas.</i> <b>Valerie Ng</b> and <b>Darrah Chavey*</b>, Beloit College (1056-C1-1887)</p> <p>1:40PM ▶ (1860) <i>Modeling Heraldic Design Using Shape Grammars.</i> Preliminary report. <b>Barbara A. Ashton</b>, BMCC - City University of New York (1056-C1-1547)</p> <p>2:00PM ▶ (1861) <i>Hyperbolic Conic Section through Kinetic Sculpture.</i> <b>Jeff Chyatte</b>, Montgomery College (1056-C1-1410)</p> <p>2:20PM ▶ (1862) <i>Mathematics, art, and the Fusion Project.</i> Preliminary report. <b>Benjamin Wells</b>, University of San Francisco (1056-C1-1320)</p> <p>2:40PM ▶ (1863) <i>The Mathematical Development of Music.</i> <b>Alan Levine</b>, Franklin and Marshall College (1056-C1-1236)</p> <p>3:00PM ▶ (1864) <i>Group explorations and art projects in a mathematics of art course for first-year students.</i> <b>Debra L. Hydorn</b>, University of Mary Washington (1056-C1-1757)</p> <p>3:20PM ▶ (1865) <i>What is sangaku?</i> Preliminary report. <b>Peter N Wong</b>, Bates College (1056-C1-382)</p> <p>3:40PM ▶ (1866) <i>Writing Critically with Enthusiasm for Mathematicians.</i> <b>Suzanne Galayda*</b>, New Mexico State University, and <b>Alexandra D'Italia</b>, Southwestern Law School (1056-C1-1405)</p> <p>4:00PM ▶ (1867) <i>Visualizing the Dynamics of the Unit Circle Group.</i> Preliminary report. <b>Anne M. Burns</b>, Long Island University, C.W. Post Campus (1056-C1-353)</p> <p>4:20PM ▶ (1868) <i>A Feigenbaum Face.</i> <b>Ann Robertson</b>, Connecticut College (1056-C1-1955)</p> <p>4:40PM ▶ (1869) <i>Lithographs Representing Some Mathematical Topics.</i> <b>Lisl Gaal</b>, University of Minnesota (1056-C1-1789)</p>	

## Program of the Sessions – Saturday, January 16 (cont'd.)

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- 5:00PM ► (1870) *Monument to Error, Perspectives: The Love of Form, and Solution Set.*  
**Jeffrey M Groah**, Lone Star College-Montgomery (1056-C1-392)
- 5:20PM ► (1871) *Further Aesthetic Explorations in Phase Space.*  
**Douglas E. Norton**, Villanova University (1056-C1-1801)
- MAA Session on General Contributed Papers, XII**
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- 1:00 PM – 5:10 PM Room 3000,  
3rd Floor, Moscone
- Organizers: **Eric S. Marland**, Appalachian State University  
**Daniel J. Curtin**, Northern Kentucky University
- 1:00PM ► (1872) *On Determining the Number of Clusters-An Empirical Study of Different Algorithms.*  
**Brian Bies**, Washington University in St Louis, **Kathryn Dabbs**, University of Tennessee, and **Hao Zou\***, Macalester College (1056-Z1-1500)
- 1:15PM ► (1873) *The Spaghetti Model: DNA Sequencing using Graph Theory.*  
**Faun C. C. Doherty**, **Peter A. Gentile\***, **Jennifer M. Magee** and **Christian J. Miedel**, Washington and Jefferson College (1056-Z1-240)
- 1:30PM ► (1874) *Uniquely H-Saturated Graphs.*  
**Joshua Cooper**, University of South Carolina, **John Lenz**, **Timothy LeSaulnier**, **Paul Wenger\*** and **Douglas B. West**, University of Illinois at Urbana-Champaign (1056-Z1-1195)
- 1:45PM ► (1875) *A vertex ordering result for an application of DNA sequencing using tripartite unit probe interval graphs.*  
**Faun C. C. Doherty**, **Christian J. Miedel\***, **Peter A. Gentile** and **Jennifer M. Magee**, Washington and Jefferson College (1056-Z1-239)
- 2:00PM ► (1876) *Higher Reciprocity.* Preliminary report.  
**Nancy Carol Buck**, University of North Carolina Greensboro (1056-Z1-754)
- 2:15PM ► Break.
- 2:30PM ► (1877) *A connectivity preserving discontinuous function.*  
**Jeffrey M Groah**, Lone Star College-Montgomery (1056-Z1-389)
- 2:45PM ► (1878) *PTA(9)s fixed under multiplier -1.*  
**Chirashree Bhattacharya**, Randolph-Macon College (1056-Z1-1795)
- 3:00PM ► (1879) *Linear Operators and Zeros of Polynomials.* Preliminary report.  
**Andrzej Piotrowski**, University of Alaska Southeast (1056-Z1-2038)
- 3:15PM ► (1880) *Be the Volume: A hands-on method for presenting the estimation of volume under a surface.*  
**Jessica M Mikhaylov**, US Military Academy, West Point (1056-Z1-1282)
- 3:30PM (1881) *Dual Enrollment vs Dual Enrollment.*  
**Larry Bouldin\*** and **Benjamin King**, Roane State Community College (1056-Z1-1364)
- 3:45PM (1882) *Is Mathematics Indispensable and Are Pre-requisites Needed in Mathematics Courses?*  
**Padraig M. McLoughlin**, Kutztown University of Pennsylvania (1056-Z1-356)
- 4:00PM ► (1883) *Teaching a Course on Women in Mathematics.* Preliminary report.  
**Cynthia J Woodburn**, Pittsburg State University (1056-Z1-516)
- 4:15PM (1884) *A Basic College Level Mathematics course for a lay man knowing only four basic operations with nonnegative integers.*  
**Santanu Chakraborty**, University of Texas - Pan American, Edinburg, Texas (1056-Z1-80)
- 4:30PM ► (1885) *Experiences in Recruiting, Retention and Graduation in the Kean STEM Scholarship Program.*  
**Louis Beaugris\***, **Pablo Zafra** and **Kikombo NGoy**, Kean University (1056-Z1-875)
- 4:45PM ► (1886) *Riverbend Community Math Center – Promoting mathematical thinking in local elementary and middle schools.* Preliminary report.  
**Amanda Katharine Serenevy**, Riverbend Community Math Center (1056-Z1-989)
- 5:00PM (1887) *Reversing the Pattern of Low Performance in College Algebra Using the National Center for Academic Transformations' Roadmap Model.*  
**A. Dale Magoun\***, **A. Serpil Saydam** and **Charlotte H. Owens**, University of Louisiana at Monroe (1056-Z1-833)
- MAA Session on Mathlets for Teaching and Learning Mathematics**
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- 1:00 PM – 5:35 PM Room 2020,  
2nd Floor, Moscone
- Organizers: **Joe Yanik**, Emporia State University  
**Thomas E. Leahrum**, Jacksonville State University  
**David M. Strong**, Pepperdine University
- 1:00PM ► (1888) *Mathlets for Visualizing the Geometry of Numbers.*  
**Karl-Dieter Crisman**, Gordon College (1056-K1-1741)
- 1:20PM ► (1889) *Number Lab: Experiencing Numbers.*  
**David B Posner**, Napa CA (1056-K1-302)
- 1:40PM (1890) *National Curve Bank.*  
**Shirley B. Gray**, California State University, Los Angeles (1056-K1-119)
- 2:00PM ► (1891) *Retrieving old mathematics with new technology.*  
**Susan L. Addington**, California State University, San Bernardino (1056-K1-1810)

## **Saturday, January 16 – Program of the Sessions**

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| <p>► 2:20PM<br/>► (1892) <i>Linear programming with mathlets.</i><br/><b>H. Smith Risser</b>, Montana Tech<br/>(1056-K1-189)</p> <p>► 2:40PM<br/>(1893) <i>A Picture is Worth a Thousand Words in Geogebra.</i><br/><b>Joanne C Caniglia</b>, Kent State University<br/>(1056-K1-150)</p> <p>► 3:00PM<br/>(1894) <i>Multivariable Calculus Java Applets with Blaise.</i> Preliminary report.<br/><b>Elisha Peterson</b>, United States Military Academy (West Point) (1056-K1-1272)</p> <p>► 3:20PM<br/>(1895) <i>Geometric Constructions as Interactive Java Applets with Feedback Feature.</i><br/><b>Tibor Marcinek</b>, Central Michigan University (1056-K1-1474)</p> <p>► 3:40PM<br/>(1896) <i>Dynamic Visualization Tools for Multivariable Calculus.</i> Preliminary report.<br/><b>Paul E Seeburger</b>, Monroe Community College (1056-K1-907)</p> <p>► 4:00PM<br/>(1897) <i>Hypothesis Testing: Tools for Exploration and Practice.</i><br/><b>Sarah L Mabrouk</b>, Framingham State College (1056-K1-1486)</p> <p>► 4:20PM<br/>(1898) <i>Google-opoly.</i><br/><b>Tim Chartier</b>, Davidson College (1056-K1-1532)</p> <p>► 4:40PM<br/>(1899) <i>The Lurch Project: Validation on Demand.</i> Preliminary report.<br/><b>Nathan Carter</b>, Bentley University, <b>Paul F Christiano</b>, MIT, and <b>Kenneth G Monks*</b>, University of Scranton (1056-K1-1588)</p> <p>► 5:00PM<br/>(1900) <i>Applets for Discovery and Assessment in Math for Liberal Studies.</i><br/><b>Doug Ensley*</b> and <b>James Hamblin</b>, Shippensburg University (1056-K1-1966)</p> <p>► 5:20PM<br/>(1901) <i>Graph2D: An Interactive Graphing Library using the HTML Canvas.</i><br/><b>R. Alexander Milowski</b>, San Francisco, CA (1056-K1-1499)</p> | <p>► 1:40PM<br/>(1903) <i>Investigating Student Conceptions of Function Composition.</i> Preliminary report.<br/><b>Stacey A. Bowling</b>, Arizona State University (1056-P5-1101)</p> <p>► 2:00PM<br/>(1904) <i>How beginning teachers understand student thinking in calculus.</i> Preliminary report.<br/><b>Thomas W Judson*</b>, Stephen F. Austin State University, and <b>Matthew Leingang</b>, New York University (1056-P5-680)</p> <p>► 2:20PM<br/>(1905) <i>The Role of Angle Measure and the Radius as a Unit of Measurement in Developing Coherent Understandings of Trigonometric Functions.</i><br/><b>Kevin C. Moore</b>, Arizona State University (1056-P5-671)</p> <p>► 2:40PM<br/>(1906) <i>Parameter or variable or unknown? The special case of the definite integral.</i> Preliminary report.<br/><b>May F Hamdan</b>, Lebanese American University (1056-P5-446)</p> <p>► 3:00PM<br/>(1907) <i>Students' Understandings of Equivalence Relations.</i><br/><b>Jim Brandt</b>, Southern Utah University (1056-P5-1956)</p> <p>► 3:20PM<br/>(1908) <i>Learning the phase plane: How two students' understandings of time and rate affected their learning of exponential functions.</i><br/><b>Carlos W Castillo-Garsow</b>, Arizona State University (1056-P5-1568)</p> <p>► 3:40PM<br/>(1909) <i>The Role of Homework in Developing Students' Mathematical Conceptions.</i> Preliminary report.<br/><b>Eric D Weber*</b> and <b>Marilyn P Carlson</b>, Arizona State University (1056-P5-303)</p> <p>► 4:00PM<br/>(1910) <i>Enhancing Undergraduate Students' Views and Experiences of Learning Mathematics in Inquiry-Based Learning Contexts.</i><br/><b>Marja-Liisa Hassi*</b>, Sandra Laursen and Anne Parrie Hunter, Ethnography &amp;</p> |
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## ***MAA Session on Research on the Teaching and Learning of Undergraduate Mathematics, II***

**1:00 PM - 4:55 PM**      **Room 2024,  
2nd Floor, Moscone**

Organizers: **Keith Weber**, Rutgers University  
**Stacy Brown**, Pitzer College  
**Natasha A. Speer**, University of Maine  
**Karen A. Marrongelle**, Portland State University

- 1:00PM (1902) *Early Eigen Thinking: Students' Interpretations of the Matrix Equation Ax=2x.*  
**Christine Larson\***, Indiana University,  
**Michelle Zandieh**, Arizona State  
University, **Chris Rasmussen** and  
**Frances Henderson**, San Diego State  
University (1056-P5-1366)

## **MAA Session on Visualization in Mathematics, II**

**1:00 PM - 5:15 PM**      **Room 2009,  
2nd Floor, Moscone**

Organizers: **Sarah J. Greenwald**,  
Appalachian State University

## Program of the Sessions – Saturday, January 16 (cont'd.)

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	Walter Whiteley, York University
1:00PM ► (1913)	<i>Visual Analytics to Explore Elementary Probability.</i> Preliminary report. <b>James D. Factor</b> , Alverno College, and <b>Edmond J. Nadler*</b> , Eastern Michigan University (1056-R5-2027)
1:20PM ► (1914)	<i>Visualization via Excel in Mentoring Mathematics Faculty of a Developing Nation.</i> <b>Deane E. Arganbright</b> , Divine Word University, Madang, Papua New Guinea (1056-R5-362)
1:40PM ► (1915)	<i>Using Computer Graphics as an Aid to Visualizing Functions of a Complex Variable.</i> <b>Laurene V. Fausett</b> , TAMU-Commerce (1056-R5-252)
2:00PM (1916)	<i>Efficient Graph Visualization for Applications: Databases, Data Mining, and Video Games.</i> <b>Charles Andrew Tannouri</b> , Towson University (1056-R5-1978)
2:20PM ► (1917)	<i>Confluent Graphs: Making Graphs Pretty.</i> <b>Talitha M Washington</b> , University of Evansville (1056-R5-1614)
2:40PM (1918)	<i>Pedagogical Understanding of Non-Textual Elements in Mathematics Textbooks among Teachers and Curriculum Developers.</i> Preliminary report. <b>Rae Young Kim*</b> and <b>Sharon Senk</b> , Michigan State University (1056-R5-2045)
3:00PM ► (1919)	<i>Diagrams in Abstract Algebra: How are Diagrams used in the Proving Process?</i> Preliminary report. <b>Nissa Yestness</b> , University of Northern Colorado (1056-R5-2072)
3:20PM (1920)	<i>Visualization Lessons from Visual Group Theory.</i> <b>Nathan Carter</b> , Bentley University (1056-R5-1812)
3:40PM ► (1921)	<i>Visualizing the polyhedral geometry of algebraic systems.</i> <b>Marshall Hampton</b> , University of Minnesota Duluth (1056-R5-290)
4:00PM (1922)	<i>Visualization for the Simulation of the Chemical Vapor and Infiltration Process.</i> <b>Joyati Debnath*</b> , Winona State University, Winona, MN, <b>Srabasti Dutta</b> , College of Saint Elizabeth, and <b>Andrew Jones</b> , Florida A & M University (1056-R5-657)
4:20PM ► (1923)	<i>Educational Applications of Projective Geometry.</i> Preliminary report. <b>David Booth</b> , Austin Texas (1056-R5-1064)
4:40PM ► (1924)	<i>Projective Geometry as a Vehicle for Schooling the Imagination, I.</i> <b>Martin Levin</b> , Silver Spring, MD (1056-R5-1090)
5:00PM (1925)	<i>Projective Geometry as a Vehicle for Schooling the Imagination II.</i> <b>Martin Levin</b> , Silver Spring, MD (1056-R5-1589)

## SIAM Minisymposium on New Trends in Mathematical Methods in Imaging Science

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1:00 PM – 5:50 PM	Room 2002, 2nd Floor, Moscone
	Organizers: <b>Rick Chartrand</b> , Los Alamos National Laboratory
	<b>Stacey E. Levine</b> , Duquesne University
	<b>Jennifer L. Mueller</b> , Colorado State University
	<b>Luminita A. Vese</b> , University of California Los Angeles
1:00PM ► (1926)	<i>Nonconvex compressive sensing: getting the most from very little information.</i> <b>Rick Chartrand</b> , Los Alamos National Laboratory (1056-90-1078)
1:30PM (1927)	<i>This is SPIRAL TAP: Sparse Poisson intensity reconstruction algorithms (theory and practice).</i> <b>Zachary T. Harmanny</b> , Duke University, <b>Roummel F. Marcia*</b> , University of California, Merced, and <b>Rebecca M. Willett</b> , Duke University (1056-68-662)
2:00PM (1928)	<i>Locally Adaptive Kernel Regression: A Non-parametric Framework for Multidimensional Signal Processing and Analysis.</i> <b>Hiroyuki Takeda</b> , <b>Hae Jong Seo</b> and <b>Peyman Milanfar*</b> , University of California, Santa Cruz (1056-62-1599)
2:30PM (1929)	<i>Hyperspectral Image Classification by Matching Node Connectivities.</i> <b>Naoki Saito*</b> , University of California, Davis, and <b>Linh Lieu</b> , New York, NY (1056-62-1209)
3:00PM ► (1930)	<i>Comparisons of reconstruction methods in electrical impedance tomography on a mammography geometry.</i> <b>Ethan K Murphy*</b> , <b>David Isaacson</b> , <b>Gary Saulnier</b> and <b>Jon Newell</b> , Rensselaer Polytechnic Institute (1056-65-1216)
3:30PM (1931)	<i>Local stability in a minimization problem for conductivity imaging.</i> <b>M. Zuhair Nashed*</b> and <b>Alexandru Tamasan</b> , University of Central Florida (1056-49-1684)
4:00PM (1932)	<i>Total Variation and Cheeger Ratio Cuts.</i> Preliminary report. <b>Arthur D Szlam*</b> , Courant Institute and UCLA math, and <b>Xavier Bresson</b> , UCLA math (1056-49-1013)
4:30PM ► (1933)	<i>Variational methods for data fusion, segmentation, deblurring, and image inpainting.</i> <b>Andrea Bertozzi</b> , UCLA (1056-49-695)
5:00PM (1934)	<i>Novel Integro-differential equations in image processing and its applications.</i> <b>Eitan Tadmor</b> , University of Maryland, College Park, and <b>Prashant Athavale*</b> , University of California, Los Angeles (1056-49-1717)



## **Program of the Sessions – Saturday, January 16 (cont'd.)**

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Panelists: **Mariah Birgen**, Wartburg College  
**Lipika Deka**, California State University-Monterey Bay  
**Nezam Iraniparast**, Western Kentucky University  
**Brian Miceli**, Trinity University

### **AMS-MAA-SIAM Gerald and Judith Porter Public Lecture**

---

**3:00 PM – 4:45 PM** **Main Lecture Room, 2nd Floor, Moscone**  
► (1958) *The calculus of friendship.*  
**Steven Strogatz**, Cornell University (1056-00-40)  
4:00PM Reception: Please come to greet and chat with the speaker. Light refreshments will be served.

### **AMS Session on Algebras, II**

---

**2:30 PM – 3:40 PM** **Room 2008, 2nd Floor, Moscone**

2:30PM (1949) "Separating the Degree Spectra of Structures" and Beyond: An Overview of My Dissertation in Computable Model Theory with Some New Extensions.  
**Tyler J Markkanen**, Saint Mary-of-the-Woods College (1056-03-1592)

2:45PM (1950) Model Theory of Stable Groups.  
**Paul Baginski**, Université Lyon 1 (1056-03-1682)

3:00PM (1951) Continuous Control in Exact Non-Split Categories. Preliminary report.  
**Timothy K Lance**, Francis Marion University (1056-19-647)

3:15PM (1952) Motivic symmetric ring spectrum representing algebraic K-theory.  
**Youngsoo Kim**, University of Illinois at Urbana-Champaign (1056-19-1069)

3:30PM ► (1953) Simply Un-Real: Grassmann hypercomplex numbers, geometric algebra, and the (past and) future of "vector" calculus. Preliminary report.  
**Debra A. Warne\*** and **Paul G. Warne**, James Madison University (1056-08-1553)

### **ASL Contributed Papers, II**

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**3:10 PM – 5:20 PM** **Room 2004, 2nd Floor, Moscone**

3:10PM (1959) A simple epsilon substitution method for ID1.  
**Grigori Mints**, Stanford University

3:35PM (1960) Trees, sheaves and definition by recursion.  
**Nate Ackerman**, University of California, Berkeley

4:00PM (1961) A bimodal deontic evidential logic for the right to prove truths.  
**Billy Joe Lucas**, Manhattanville College

4:35PM (1962) Characterizations of stable and NIP theories by generalized indiscernible sequences.  
**Lynn Scow**, University of California, Berkeley

5:00PM (1963) Expansion of Presburger Arithmetic with a predicate for  $\lfloor \sqrt{2}x \rfloor$ .  
**Demirhan Tunc**, University of Notre Dame

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

---

**2:30 PM – 4:20 PM** **Room 2007, 2nd Floor, Moscone**

2:30PM (1954) Interpolation on Rational Surfaces.  
**Amanda Knecht**, University of Michigan (1056-14-152)

3:00PM (1955) Killing Forms of Isotropic Lie Algebras.  
**Audrey Malagon**, Mercer University (1056-17-181)

3:30PM (1956) The mixed boundary value problem in Lipschitz domains.  
**Katharine A. Ott\*** and **Russell Brown**, University of Kentucky (1056-35-744)

4:00PM (1957) K3 surfaces with discrete symmetry groups.  
**Ursula Anne Whitcher**, Harvey Mudd College (1056-14-201)

### **MAA Minicourse #2: Part B**

---

**3:30 PM – 5:30 PM** **Pacific H, Marriott San Francisco**

Using GeoGebra to create activities and applets for visualization and exploration.  
Organizer: **Michael K. May**, Saint Louis University

### **MAA Minicourse #9: Part B**

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**3:30 PM – 5:30 PM** **Pacific I, Marriott San Francisco**

Getting students involved in undergraduate research.  
Organizers: **Aparna W. Higgins**, University of Dayton  
**Joseph A. Gallian**, University of Minnesota Duluth

### **Reception in Honor of Retiring MAA Secretary Martha Siegel**

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**5:00 PM – 6:15 PM** **Foothills G, Marriott San Francisco**

*Saturday, January 16 – Program of the Sessions*

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***AMS Banquet Reception***

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**6:30 PM – 7:30 PM**                   **Club Room,**  
**Marriott San Francisco**

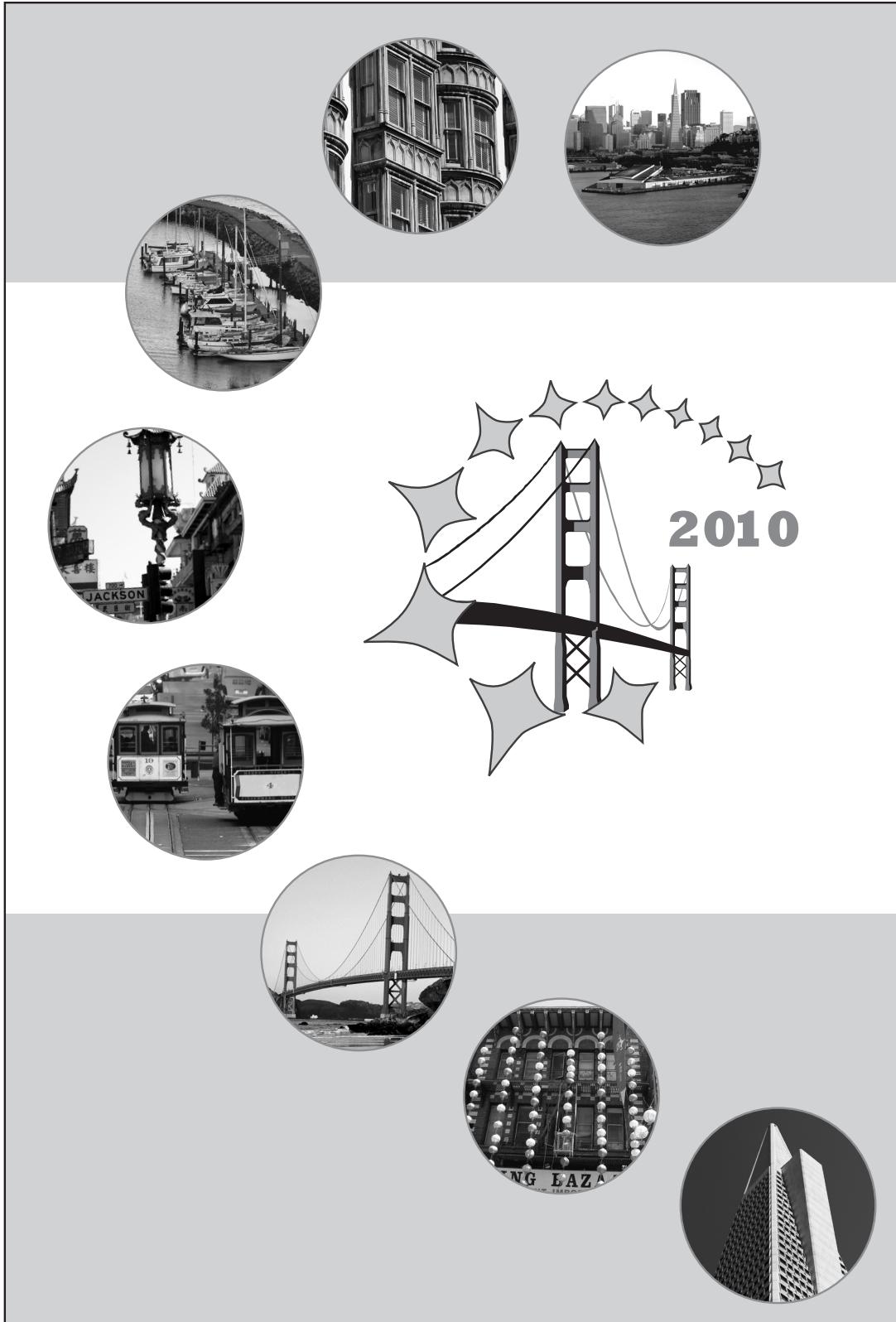
***AMS Banquet***

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**7:30 PM – 10:00 PM**                   **Atrium, Marriott**  
**San Francisco**

**Matthew Miller**  
AMS Associate Secretary  
Columbia, South Carolina

**Gerard A. Venema**  
MAA Associate Secretary  
Grand Rapids, Michigan



# Mathematical Sciences Employment Center

## 2010 Employment Center Schedule:

**December 22, 2009**—Advance registration deadline for JMM. Meeting badge will be required for admittance.

After this date, meeting registration fees go up and meeting registration can only happen on site in San Francisco.

### OPEN HOURS:

**Wednesday, January 13, 2010**—8:00 a.m.–7:00 p.m. Do not schedule interviews before 9:00 a.m. on this day.

**Thursday, January 14, 2010**—8:00 a.m.–7:00 p.m.

**Friday, January 15, 2010**—8:00 a.m.–7:00 p.m.

**Saturday, January 16, 2010**—9:00 a.m.–noon

**Note:** Computer scheduling is no longer provided at the Employment Center. When deciding on travel dates, keep in mind that employers may wish to conduct interviews during any of the hours listed above.

The Employment Center offers a practical meeting place for employers and applicants attending the Joint Meetings. The focus of the Employment Center is on Ph.D.-level mathematical scientists and those that seek to hire them from academia, business, and government.

## Employment Center Now Fully Electronic

This year all forms will be submitted and accessed electronically on the Web. In addition, registered attendees will be able to utilize a basic scheduling tool in advance on the Web. The website and all information will be available beginning in September 2009 and will remain accessible through the period of the Employment Center. The same applicant and job information available on the Employment Center/EIMS website during the months preceding the event in San Francisco will be accessible during the JMM on computer terminals available at the Employment Center.

**There will be no printed books or paper forms.** Also, there will be no paper message center since the new electronic system allows for

interview arrangements. As of 2009, the on-site computer-scheduling program was discontinued. The new electronic system represents a significant enhancement of the Employment Center.

## No Admittance Without a JMM Badge

All applicants and employers planning to enter the Employment Center—even just for one interview—must present a 2010 Joint Meeting Registration badge or they will be denied admittance. This is not a new policy, but it will now be strictly enforced. Meeting badges are obtained by registering for the Joint Mathematics Meetings. See the JMM website at: [http://www.ams.org/amsmtgs/2124\\_intro.html](http://www.ams.org/amsmtgs/2124_intro.html) for registration instructions and rates.

## Employers: Choose a Table

There are two table types available for employers, based on the number of interviewers who will be present at any one time:

- one or two interviewers per table in the “Quiet Area”: before 11/2/09 (US\$145), after 11/2/09 (US\$185), additional table (US\$85).
- three to six interviewers per table in the “Committee Table” area: before 11/2/09 (US\$230), after 11/2/09 (US\$270), additional table (US\$135).

In addition to the table fees, appropriate ad fees must be paid at the time the ad is submitted. Please note that the traditional advertising site on the AMS website, EIMS, now also serves as the ad placement site for the Employment Center. An existing EIMS ad can be earmarked for Employment Center use, and the table fee will be paid at that time.

All fees are to be paid at the EIMS ad website; fees are no longer paid through the JMM registration form. However, individual registration for the JMM is required for all interviewers and no admittance is possible without a JMM badge.

## Employers: How to Register

Registration begins September 1, 2009, at the following website: <http://eims.ams.org>.

Use of the EIMS website is through password-accessible accounts, one per employer. Please place your ad and select your table type, paying all fees on the website. Whoever places the ad will want to make careful note of the account access password in case faculty or other personnel need



## **Employment Center**

to access the resume review and scheduling features in the months leading up to the Employment Center.

Once registered, employers will gain access to applicant data as it is submitted to the site. There will be applicant resumes on the site, but employers will want to notice especially the resumes marked "Employment Center". Also, employers can review and sort the requests for interviews submitted by applicants on the system. To respond to a request, employers will be able to access the applicant's pre-approved schedule and fill in the desired slot or slots. In this way, employers will build their own schedule, which is also viewable after logging in on the system.

**Registration on Site:** Please see an Employment Center staff person for details.

For complete information, visit <http://www.ams.org/emp-reg/>.

## **Applicants: Making the Decision to Attend**

For those who are currently on the job market, the Employment Center is a central meeting place for employers and applicants who are attending the Joint Meetings. After submitting information and a limited number of documents on the Employment Center/EIMS website, applicants will review the jobs ads marked "Employment Center" and, if desirable, mark a box indicating interest. They will also mark hours of availability on their personal schedule screen. Employers may, at any time, respond by filling in an interview slot on the applicant's schedule.

All information is available on the website in advance, and now that this electronic service is in place, there is no other messaging conducted on paper. Computer workstations will be available for brief use on site. The only difference between information available in advance, and what is available on site would be the addition of possible on-site employer registrations and any last minute scheduling done by employers.

There will ordinarily be no research-oriented postdoctoral positions listed or discussed at the Employment Center. In the current job market, the majority of Employment Center employers are academic departments of mathematical sciences seeking to meet a short list of applicants who applied for their open positions during the fall. Opportunities to meet employers with whom no previous contact was made are becoming quite rare. Each year, a few government or industry employers are present. Often, they are seeking U.S. citizens only due to existing contracts.

If timely registration, following the website instructions, and marking each appropriate employer (thereby seeking interview invitations)

does not produce interviews, then there will be little to no opportunity to attract the interest of employers on site. Through the new software the Employment Center intends to become increasingly arranged in advance, predictable, and calm.

Most appointments will go to applicants who applied to jobs during the fall and are now being sought out by the institutions for in-person meetings during the JMM. Applicants should understand that the Employment Center offers no guarantees of interviews or jobs. Hiring decisions are not made during or immediately following such interviews. A good outcome, in the following weeks or months, would be an invitation for a campus visit.

In a recent survey, fifty percent of applicants responding reported being invited for at least one on-campus visit to an employer they had interviewed with at the Employment Center.

## **Applicants: How to Register**

There are no Employment Center fees for applicants; however, admission to the Employment Center room requires a 2010 JMM badge, obtainable by registering (and paying a fee) for the Joint Mathematics Meetings.

Registration is possible beginning September 1, 2009, at <http://eims.ams.org> and continuing through Day One of the Employment Center in San Francisco. Early registration is vital since most employers will finalize schedules before arriving in San Francisco.

To register for a badge, go to [http://www.ams.org/amsmtgs/2124\\_intro.html](http://www.ams.org/amsmtgs/2124_intro.html).

It is possible to attend one or more privately arranged interviews without official Employment Center registration, however, a meeting badge is required to access the interview room.

For complete information, visit <http://www.ams.org/emp-reg/>.

Questions about the Employment Center registration and participation can be directed to Steve Ferrucci, AMS Membership and Programs Department, at 800-321-4267, ext. 4113, or by email to [emp-info@ams.org](mailto:emp-info@ams.org).

**Registration on Site:** Registering on site is possible, however, there will be little or no opportunity to attract the interest of employers. Through the new software the Employment Center intends to become increasingly arranged in advance, predictable, and calm.

Applicants who must register on site should first register for the meeting at the Joint Mathematics Meetings Registration Desk, then your badge will admit you to the Employment Center area and you should speak with one of the staff there.

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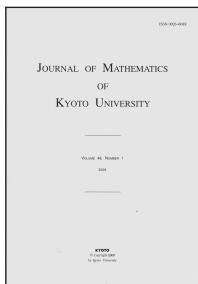


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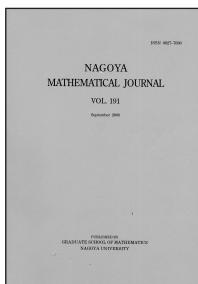
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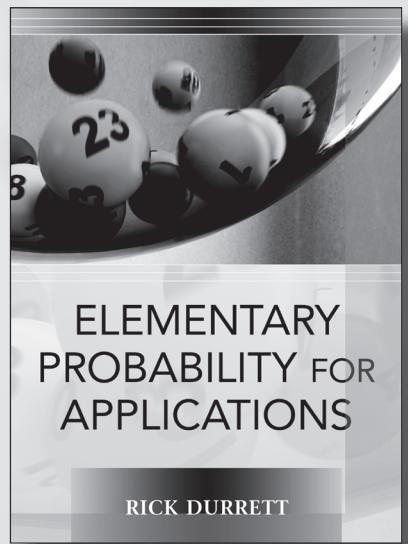
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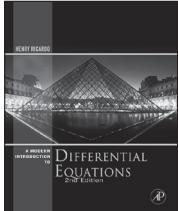
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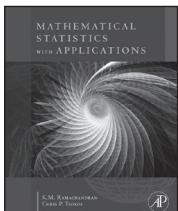
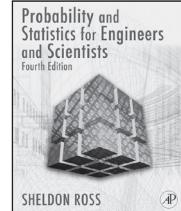
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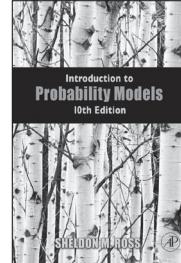
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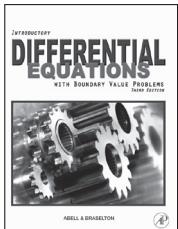
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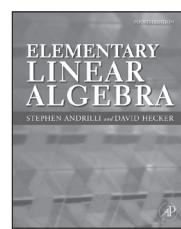
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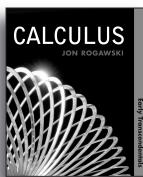
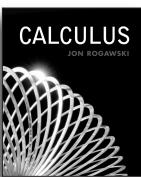
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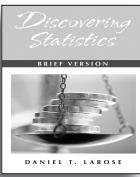
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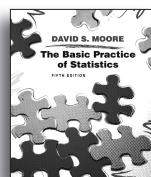
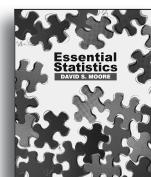
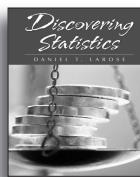
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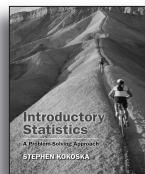
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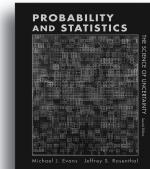
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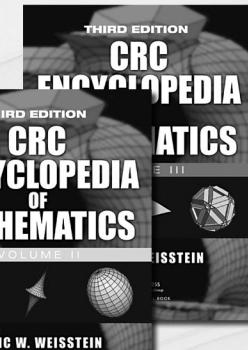
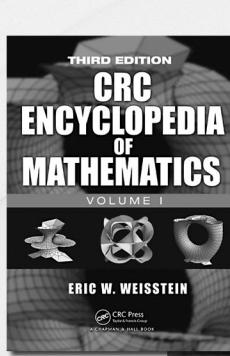
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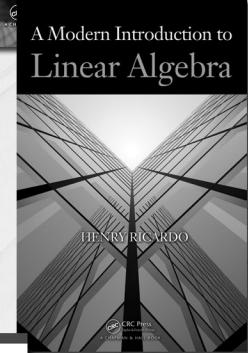
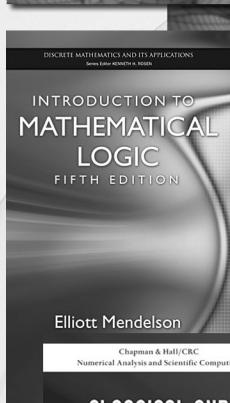
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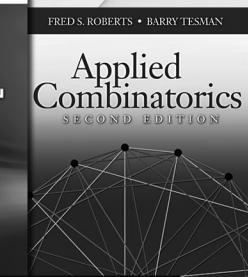
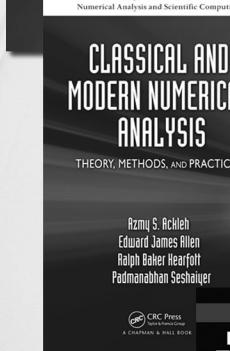
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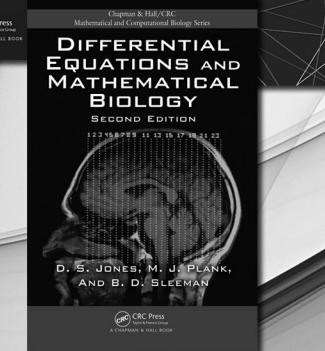
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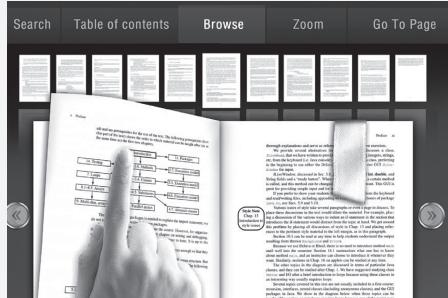


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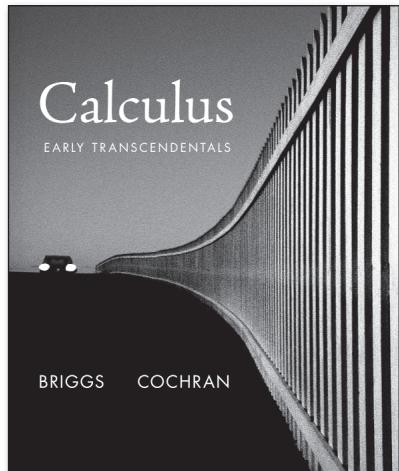
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**January 9–12, 2013**

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**San Antonio, TX**  
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- B. even



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0%  
0%

- A. 513



- A. 513  
B. 1127  
C. 1476



Come see the first **national Who Wants to Be a Mathematician** at the 2010 Joint Mathematics Meetings in San Francisco. High school students from across the U.S. will compete for a top prize of \$5000.



# MathFest 2010



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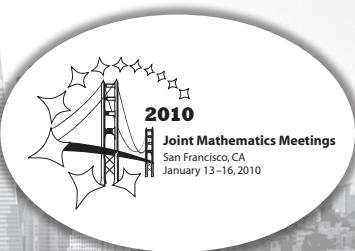
MathFest is one of the largest annual summer meetings of mathematicians in the United States, bringing together more than 1,500 math enthusiasts every year.



Mathematical Association of America

# Miscellaneous/Local Information

## Miscellaneous/Local Information



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## Green Efforts at the Joint Mathematics Meetings

The AMS and the MAA recognize the importance of contributing to global efforts by adopting eco-friendly practices at the Joint Mathematics Meetings (JMM). We are fortunate this year to host the JMM at the Moscone Center in San Francisco. San Francisco—with its hybrid taxis, ban on plastic bags, solar-paneled convention center, and solar-paneled scoreboard at AT&T ballpark—has been at the forefront of the green movement. Scores of hotels, restaurants, attractions, and tours also do their part to make environmentally friendly choices.

### **The Moscone Center**

The Moscone Center was recently given the prestigious 2009 Environmental Achievement Award by the U.S. Environmental Protection Agency (EPA) Pacific Southwest Region 9 for distinguishing itself as a sustainable building that has helped to protect the environment. SMG was also a recipient of this award. For more details about the center's award winning efforts and accomplishments, go to [http://mediocache.smgbooking.com/14940\\_EPAwardsMosconeCenter.pdf](http://mediocache.smgbooking.com/14940_EPAwardsMosconeCenter.pdf).

### **Hotels**

San Francisco hotels implement these (and other) eco-friendly practices: towel and linen reuse program; 100 percent nonsmoking policy; recycling program for guests; use of compact fluorescent lights instead of incandescent bulbs; use of nontoxic cleaning products by housekeeping staff. In addition, many of the hotels compost food waste and have installed devices that power down heating and cooling when guestrooms are not occupied.

Since 2004 the Marriott has been awarded more ENERGY STAR labels than any other hotel company. In addition, the Parc 55 has received an ENERGY STAR label, the Intercontinental has made great strides to achieve LEED (Leadership in Energy & Environmental Design) certification by early 2010, and the Serrano's Kimpton EarthCare program is nationally recognized.

### **JMM Operating Procedures**

As part of the ongoing planning process for these meetings, our green practices include:

- providing all registration, housing, and abstract submission forms online
- minimizing packing materials
- providing a link to lecture notes online
- printing materials on both sides
- ensuring that all meeting events are within the downtown area and require minimum transportation
- providing name badge collection bins at the end of the meeting so badges can be recycled
- providing exhibitors with mandatory green standards such as using less printing and more digital information transfer
  - incorporating a "Leave No Trace" program, which requires exhibitors to remove all materials from their exhibits after the meeting

### **What can you do as a participant?**

- Make a conscious effort to recycle, not only while in the meeting venues but also while touring or enjoying the local area.
  - Use coffee mugs and refillable water containers.
  - Take advantage of the linen and towel reuse program in the hotel rooms.
  - Be conscious of your water consumption.
  - Take only those brochures, collateral, or gifts that you know you'll use.
  - Consider sharing a taxi with others from your hotel who are also heading to the convention center or the airport.
  - Consider using local transit such as BART, MUNI, or Cal Train to get to San Francisco and the Moscone Center.
  - Consider offsetting your flight to and from San Francisco. There are several reputable companies that can do this for you. A simple Google search will show you the way.
  - Check out [www.begreennow.com](http://www.begreennow.com) and use the carbon calculator to see your footprint. Go to [www.lighterfootstep.com](http://www.lighterfootstep.com) for tips on living a more planet-friendly lifestyle.

The AMS and the MAA will continue to strive to minimize our impact on the Earth while providing participants with a world-class education, training, and networking event. We invite all participants and suppliers to join us in our efforts to make this meeting and our lives more earth friendly.



## Abstracts

A booklet containing abstracts all talks presented at this meeting as submitted through the JMM website by the stated deadline is available near Advance Registration pickup at the Meetings Registration Desk.



## Badges/Badge holders

Any participant who loses or misplaces his/her badge may request a replacement at the Registration Assistance section of the Registration Desk. There is a US\$5 service fee.

If you have no other use for it, please recycle your badge holder in the bins marked for this purpose near the Meetings Registration Desk and in the Networking area.



## Book Sales and Exhibits

The book and educational media exhibits in the Exhibit Hall on the first floor of the Moscone West Convention Center are open from 12:15 p.m. to 5:30 p.m. on Wednesday, 9:30 a.m. to 5:30 p.m. on Thursday and Friday, and 9:00 a.m. to 12:00 p.m. on Saturday. Participants are encouraged to visit the exhibits to see what's new. Official meeting badges are required in order to enter the exhibit area. Books published by the AMS and MAA will be sold to registered participants at discounted prices somewhat below the cost for the same books purchased by mail. See the complete list of exhibitors beginning on page 193.

All participants are invited to the **Grand Opening** on Wednesday at 12:15 p.m. There will be drawings for special prizes or giveaways at participating exhibit booths on Monday afternoon. Join us in making this a special and exciting event.

The AMS and the MAA cordially invite all registered participants to enjoy complimentary tea and coffee available at 12:15 p.m. and 2:00 p.m. on Wednesday; 9:30 a.m., noon, and 2:00 p.m. on Thursday and Friday; and 9:00 a.m. on Saturday.



## Check Cashing

Some hotels will cash personal checks for guests, so check at the front desk of your hotel. The Joint Meetings cashier will cash personal or traveler's checks up to US\$50 upon presentation of the official meeting registration badge, provided there is enough cash on hand. When funds are low, how-

ever, the cashier will not be able to provide this service. The cashier cannot give cash advances on credit cards.



## Child Care

The AMS and the MAA will again offer child-care services to registered participants through KiddieCorp Children's Program. These services are for children ages 6 months through 12 years old, January 13–16, 2010, 8:00 a.m.–5:00 p.m. each day in the San Francisco Marriott. Parents are encouraged to bring snacks and beverages for their children but items such as juice boxes, Cheerios, and crackers will be provided. KiddieCorp can arrange meals for children at cost plus 15% or parents can be responsible for meals for their children. Parents who have questions about specific programs that will be offered or specific requests, rules, or needs for their children must call KiddieCorp ahead of time at 858-455-1718.

The registration fee is US\$30 per family (nonrefundable). Additional cost will be US\$10 per hour per child or US\$8 per hour per child for graduate students. These reduced child care rates are made possible to the meetings participants by the AMS and the MAA. Parents must be registered for the JMM to participate. Full payment is due at the time of registration with KiddieCorp. The deadline for registering was December 16, 2009 at [www.kiddiecorp.com/jmmkids.htm](http://www.kiddiecorp.com/jmmkids.htm). Space per day will be limited so walk-ins will be accommodated on a space-available basis only. Check at the Meetings Registration Desk.

If parents do not pick up their children at the time scheduled or by the end of the day (no later than 5:00 p.m.), they will be charged a late fee of US\$5 per child for every 15 minutes thereafter.

**On-site fees are payable by cash, check, or credit card.**



## Comments and Complaints

A log for registering participants' comments or complaints is kept at the Transparencies section of the Registration Desk. Please use this method of helping us to improve future meetings. (Also see the Survey section.)



## Committee Meetings

A master list of all committee meetings is posted on the Directory of Registrants located in the lobby on the second level of Moscone West.

## Miscellaneous/Local Information



### Copies/Computer Services

Moscone West has a business center located on the first level in the Howard Street Side Lobby. The hours of operation are Wednesday through Friday, 7:00 p.m.-7:00 p.m., and Saturday 7:00 a.m.-5:00 p.m. The San Francisco Marriott will provide minimal business center services near the Front Desk (24 hour services). All other conference hotels except for the Powell have business centers. There is also a FedEx-Kinkos, at 726 Market St., 800-463-3339 and a Copy Central at 705 Market St., 882-7377.



### Directory of Registrants

An alphabetical list of registered participants, including local addresses (if provided) and arrival and departure dates is located on the second level lobby of Moscone West. Upon arrival, participants who have registered in advance should place a check mark next to their names. Those who have not supplied information on where they are staying are requested to fill in their information on the printout.

See the information under "Networking Center" for more resources about sorted lists of participants registered in advance.



### Disabilities and Special Needs

The San Francisco Convention & Visitors Bureau maintains a TDD/TYY information line at 415-392-0328. The Mayor's Office on Disability also has extensive resources on its Web site as do many city and county of San Francisco agencies located at [www.sfgov.org](http://www.sfgov.org). You may also download the latest version of the San Francisco Access Guide at <http://www.onlyinsanfrancisco.com/media/downloads/accessguide2007.pdf>. In addition, details of what the Moscone Center provides for persons with disabilities can be found at <http://www.moscone.com/pdf/guidelines/MosconeAccessibility.pdf>. Questions on-site about accessibility of session rooms or public space should be directed to the Logistics Manager at the Registration Desk. Questions on site regarding accessibility of housing should be directed to the Registration Assistance section, also at the Desk. If you wish to speak to someone before the meeting, please send email to [meet@ams.org](mailto:meet@ams.org). For your convenience, we list the following information:

1. Wheelchairs and Scooters: There are no wheelchairs or scooters available on property at the hotels or Moscone Center. Participants who need a wheelchair or scooter are responsible for making their own arrangements and should contact one of the following: 1) Wheelchairs of San Mateo, 650-342-4864 (wheelchairs only), 2) Scoot Around, [www.scootaround.com](http://www.scootaround.com), 1-888-441-7575, and 3) Benton Medical Equipment, [www.bentonmedical.com](http://www.bentonmedical.com), 888-989-3338, 650-625-1000. Ample notice, at least one week, is preferred for requests.

2. Hearing Impaired: The Marriott has ADA Kits which are free of charge and include a TTY telephone, a multi-function alertmaster notification system (alarm clock that has a bed shaker and door knocker transmitter), and telephone amplifier to assist with the TTY telephone Visual Smoke Detector. All other hotels, with the exception of the Mark Twain, have similar kits free of charge. Please note that there are a limited number of kits available at each property so participants should make their requests at the front desk of your hotel as soon as possible, preferably before the meeting.

4. Vision Impaired: The Marriott has the following available for the vision impaired: a) closed caption televisions, b) text telephones, c) visual notification devices for door knocking and telephone rings, and d) Braille writing inside all elevators, on all guest room doors, on all meeting room signs, and on all elevator landing signs above the 5th floor. Electrical outlets are located next to phone areas for plugging in text telephones. For information on other hotels, see the Access Guide mentioned above.



### Email/Internet/Wireless Access



The AMS and MAA are pleased to offer email access for all Joint Meeting participants. This service is sponsored by **Springer** and **Math for America**. The Email Center is located in the Level 1 (first floor) lobby of Moscone West, near the Registration Desk. Moscone West has complimentary wireless internet in all lobbies (one on each of the three levels). Please note that this is not high speed access; it is conducive to reading email but not for downloading big files.

• **Marriott:** Complimentary wireless internet on the first floor, by Starbucks, the bar and around the corner in the secluded seating area, as well as upstairs in the restaurant; wired/wireless in guest rooms for a daily rate of US\$12.95.

## Miscellaneous/Local Information

• **Parc 55:** Wireless internet in lobby and public areas for a daily rate of US\$12.95, and wired/wireless in guest rooms for a daily rate of US\$12.95 (same fee covers both areas).

• **W Hotel and Intercontinental:** Complimentary wireless internet in lobby; wired/wireless in guest rooms for a daily rate of US 14.95.

• **Handlery:** Wireless internet access in lobby and public spaces for a daily rate of US \$9.95, and in guest rooms for a daily rate of US\$9.95 (same fee covers both areas).

• **Mark Twain:** Wireless/wired internet available in guest rooms for a daily rate of US \$9.95. Internet available in lobby kiosk for US\$3 for 15 minutes; US\$6 for 45 minutes.

• **Serrano Hotel:** Complimentary wireless internet access in public spaces; complimentary wireless internet in guest rooms with Kimpton In-Touch sign up at [www.kimptonhotels.com/intouch/KIT\\_overview.aspx](http://www.kimptonhotels.com/intouch/KIT_overview.aspx).

• **Holiday Inn, Powell Hotel, Hotel Whitcomb:** Complimentary wireless internet available in all guest rooms, lobby and public areas.



### Employment Opportunities

The Employment Center is located on Level 1 in Moscone West. The entrance will be in the level 1 lobby near the Registration Desk. Please see the article on this professional service following the *Program of the Sessions* section on page 155.

The MAA strongly discourages the use of personal hotel sleeping rooms as the site for professional interviews of prospective employees. This practice is intimidating for some job seekers, particularly those who find the situation uncomfortable and possibly unsafe.

The AMS strongly encourages use of the Employment Center venues for all professional interviews of prospective employees at Society meetings. The use of personal hotel rooms is particularly discouraged.



### FAX Services

FAXes may be received by guests staying at the following hotels at a nominal charge by dialing the numbers below. Be sure to write the guest's name clearly on your fax:

Marriott San Francisco	415-486-8101
Intercontinental	415- 616-6581
W Hotel	415 817-7823
Serrano Hotel	415-474-4879
Parc 55	415-392-4734
Handlery Union Square	415-781-0269

Holiday Inn Civic Center	415-552-0184
Powell Hotel	415-398-3654
Hotel Mark Twain	415-673-0529
Hotel Whitcomb	415-861-1460



### Gift for Participants

A commemorative tote bag made of recyclable materials is available for all registered mathematicians courtesy of **Taylor & Francis**. Please be sure to stop by their booth in the exhibit area to thank them for providing these handy bags.

To get yours, go to the bag distribution table in the meeting registration area in the first floor lobby of Moscone West, and turn in the voucher included on your badge/ticket printout.



### Information Booths (AMS & MAA)

All participants are invited to visit the AMS and MAA booths in the exhibit area.

A representative is available at each organization's booth to answer questions about membership, publications, and other programs.



### Information Distribution

Tables are set up in the exhibit area for the dissemination of general information of possible interest to participants not promoting a product or program for sale.

If a person or group wishes to display information of a mathematical nature promoting a product or program for sale, they may do so at the Joint Books, Journals, and Promotional Materials exhibit for a fee of US\$50 per item (posters are slightly higher).

If a person or group would like to display material in the book sale area separate from the Joint Books table, the proponent must reimburse the meeting for any extra furnishings requested (tables, chairs, easels, etc.) in addition to payment per item. (This latter display is also subject to space availability.)

Please see the Exhibits Manager for details and availability.



### JMM Social Networking Sites

To provide pathways for conversation and information exchange before and during these meetings, the AMS and the MAA have created the following 1) **Wiki:** located at <http://jointmathmeetings.pbworks.com/>;

## Miscellaneous/Local Information

2) **Twitter:** follow the JMM by searching for (and include) #jointmath in your "tweets"; and 3) **Facebook:** become a fan at <http://www.facebook.com/pages/2010-Joint-Mathematics-Meetings/254597195244?ref=mf#>.



### Joint Meeting News

This is the official newsletter for the meetings, containing program updates and other important information, and it will be published daily during the meetings. Look for it at the Networking Center, Registration Desk, and at the entrance to the Invited Address room on the second level of Moscone West.



### Lecture Notes

Participants are welcome to print a copy of the AMS Colloquium Lecture Notes from [www.ams.org/amsmtgs/colloq-10.html](http://www.ams.org/amsmtgs/colloq-10.html). Lecture notes for the AMS Retiring Presidential Address by James G. Glimm will be available just before the lecture from the tables set just outside the entrance to the lecture room.



### Local Information

For information about restaurant reservations, grocery stores, pharmacies, laundromats, and other local goods and services, please check at your hotel with the concierge or the front desk, who can best advise you.

#### Computer Stores

**Apple Store San Francisco**, 1 Stockton St.. (at the corner of Market St.. near 4th), 392-0202. Monday-Saturday 10:00 a.m.-9:00 p.m., Sunday 11:00 a.m.-7:00 p.m.,

**Central Computers**, 837 Howard St.. (between 4th and 5th), 495-4888, Monday-Friday 9:00 a.m.-7:30 p.m., Weekends 10:30 a.m.-6:00 p.m.

#### Grocery Stores

**Bristol Farms**, 845 Market St.. 979-0106, in the Westfield San Francisco Centre., Monday-Saturday, 9:30 a.m.-9:00 p.m., Sunday, 10:30 a.m.-7:00 p.m.

**WholeFoods Market SOMA**, 399 4th St.., between Clara and Harrison, 618-0066, Monday-Sunday 8:00 a.m.-10:00 p.m.

#### Pharmacy

**Walgreens** (near Marriott), 825 Market St.., 543-9502, Monday-Friday 6:30 a.m.-11:30 p.m., Saturday 7:00 a.m.-11:30 p.m., Sunday 8:00 a.m.-11:30 p.m.; also at 776 Market St.., 397-0837, hours unknown.



### Lost and Found

See the Joint Meetings cashier.



### Message Board

A personal message board is located in the second level lobby of Moscone West. Participants will be able to leave messages for other participants and post them alphabetically on a corkboard. Participants may find it more efficient to leave telephone messages for other participants at the appropriate hotel (residences during the meeting are listed on the Directory of Registrants if the participant made reservations through the Mathematics Meetings Service Bureau). See the hotel page (p. 183) for phone numbers.



### Messages (telephone)

The most efficient manner for leaving a telephone message is at the participant's hotel. Messages also will be taken at the Joint Meetings Registration Desk at a telephone number to be published in *Joint Meeting News*. Messages will be recorded from January 13th through 16th during the hours that the Registration Desk is open and posted on the message board. In the case of a bona fide emergency, every attempt will be made to contact the participant as soon as possible; otherwise, each participant must take responsibility for checking the message board.



### Networking Center

In the second level lobby of Moscone West is an area with tables and chairs for the convenience of those participants who would like to take a break between sessions. Also located in this area are lists of participants sorted by university, and other lists sorted by math subject interest. We hope you will use these materials to find old friends and make new ones.

Newcomers also may want to investigate the many receptions listed in the *Social Events* and *Social Events at a Glance* sections, and the Student Hospitality Center.



## Parking

The parking map located at [www.moscone.com/pdf/MosconeParkingMap.pdf](http://www.moscone.com/pdf/MosconeParkingMap.pdf) shows the parking garages close to Moscone Center. The Fifth and Mission St./Yerba Buena parking garage is adjacent to Moscone West. It occupies one block bordered by Minna, Mission, 4th St., and 5th St.. The main entry is on Mission St., and there are two more on Minna St.. The rates are currently US\$3.50 per hour from 1-7 hours, for 7-12 hours the fee is (flat rate) US\$28, 12-24 hours (flat rate) is US\$32.

The Moscone Center parking garage is at 255 3rd St.. (between Howard and Folsom). Rates are currently US\$3 per hour or US\$24 for 24 hours.

The entrance to the Marriott San Francisco's parking garage is on Mission St., between 3rd St.. and 4th St.. Rates are US\$13 per hour or US\$55.86 daily; valet parking is US\$55.86 daily.

All parking rates are subject to change.



## Petition Table

At the request of the AMS Committee on Human Rights of Mathematicians, a table is available in the exhibit area at which petitions on behalf of named individual mathematicians suffering from human rights violations may be displayed and signed by meeting participants acting in their individual capacities. See the Program Manager for details.



## Program at a Glance

The program at a glance (timetable) is bound into your meeting program. This document provides a thumbnail sketch of all events so you can easily see which events may overlap and better plan your time. If you would like a separate copy, simply ask for one at the Registration Assistance or Transparencies sections of the Meetings Registration Desk. These are available at no charge to registered mathematicians.



## Programs (replacement)

Should you lose or misplace your program, replacement copies are available for US\$5 at the Registration Assistance section of the Registration Desk upon presentation of your meeting badge.



## Recycling

Please make use of the recycling bins near the JMM registration desk and throughout Moscone Center for your unwanted paper (badge inserts, programs, abstracts booklets, other flat paper), and the container at registration for recycling your badge holder. Also see the green initiatives for this meeting and future JMMs on page 172. The Marriott provides recycling containers for other materials, conveniently located throughout the hotel.



## Registration Desk

The Registration Desk is located in the first level lobby of Moscone West and is open Tuesday, 3:00 p.m. to 7:00 p.m.; Wednesday, 7:30 a.m.-6:00 p.m.; Thursday-Friday, 7:30 a.m. to 4:00 p.m.; and Saturday, 7:30 a.m. to 2:00 p.m. Services offered are on-site meeting and MAA minicourse registration, ticket sales for social events, transparency sales, packets for session chairs, registration/housing assistance, abstracts distribution, and audiovisual assistance. Any staff member wearing a blue badge will be happy to assist you.



## Safety When Traveling

You are at your most vulnerable when you are away from familiar surroundings. The Destination DC recommends that participants stay in well-lit, well-trafficked areas while enjoying the city.

Never wear your badge outside of the convention center.

*Thieves employ distraction tactics such as dropping money on the ground or spilling ketchup on you. When you are distracted, your briefcase can be stolen.*

*Be careful exiting a vehicle, whether car, cab, or bus. Numerous thefts occur at those times. When loading luggage, don't leave belongings unattended, even briefly.*

*You can be a target when talking on the phone or while waiting for a taxi.*

*Don't reveal your room number or discuss plans for leaving while in a crowded place—you might be overheard.*

*If you have valuables on board the plane as carry-on luggage, keep them in view at all times.*

*Beware of any offer of assistance—to help carry your cases or watch your luggage while you hail a cab.*

## Miscellaneous/Local Information

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*Beware of a limo driver who offers you a great deal on the ride to the airport. It may be part of a scheme to steal from you. Only use licensed transportation services.*

*Beware of car trouble while leaving the convention center or driving to the airport. An opportunity for theft arises when the vehicle stops because of a punctured radiator or slashed tire and you tend to the problem—and forget about the luggage.*

*Ask at the hotel front desk about streets or neighborhoods to be avoided.*

*Carry your wallet in your front pocket and your purse with the flap toward you.*

*Don't travel with a lot of cash. Carry travelers' checks and credit cards.*

*Always carry the name, address, and phone number of someone to contact in case of an emergency.*

*Use hotel lock boxes for valuables.*

—from Atwood Advantage newsletter, Summer 1996



## Sightseeing/Attractions

San Francisco is among the most picturesque and interesting of American cities. Please see the page that the San Francisco Convention and Visitors Bureau created for JMM attendees at [www.onlyinsanfrancisco.com/groups/jmm.asp](http://www.onlyinsanfrancisco.com/groups/jmm.asp). It includes tours and tour companies for San Francisco. These companies also offer popular day trips to Napa Valley and the Wine Country, and Muir Woods. For your convenience the following is a short listing of some of San Francisco's top attractions, with the addition of a few smaller ones near Moscone Center. **The area code for San Francisco is 415.** Prices are subject to change.

**Cable Cars:** San Francisco's famous cable cars are the best way to get down to the Fisherman's Wharf area. At Powell and Market streets, there is a cable car turntable which serves as the beginning stop for both the **Powell-Mason** and **Powell-Hyde** lines. The **Powell-Mason** line runs over Nob Hill and down to Bay Street at Fisherman's Wharf. The **Powell-Hyde** line runs over Nob and Russian hills to Aquatic Park near Ghirardelli Square. The **California** line runs East-West from the Financial District to Van Ness Avenue. Views as you go up and down the hills to the waterfront are spectacular. Tickets are US\$5.

**Fisherman's Wharf:** Once part of a thriving fishing industry, Fisherman's Wharf is one of San Francisco's biggest attractions. Walk along the waterfront, look at the sea lions, and see the dozens of little stands selling seafood and souvenirs

along the street (lots of Dungeness crab and clam chowder in sourdough bread bowls). The famous Ghirardelli Square (former chocolate factory) is an attractive shopping complex anchored by the Ghirardelli Ice cream and Chocolate shop. A few steps away, there are the interesting historic ships at **Hyde Street Pier** ([www.nps.gov/safr](http://www.nps.gov/safr)), the location of the **San Francisco Maritime National Historic Park**. The ships include the 1886 square-rigger *Balclutha*, 1890 steam ferryboat *Eureka*, 1891 scow schooner *Alma*, 1895 schooner *C.A. Thayer*, 1907 steam tug *Hercules*, and 1915 steam schooner *Wapama*. Although you can walk past them and look for free; the fee is US\$5 to tour the ships (free on Sundays).

The **Cannery** Shopping Center at the foot of Fisherman's wharf was created out of the former Del Monte cannery factory. **Pier 39**, a short distance down the waterfront, offers more shops, sea lions, street performances, and the **Aquarium on the Bay** ([www.aquariumofthebay.org](http://www.aquariumofthebay.org)), which focuses on local aquatic animals and fish from the Bay and surrounding areas, and includes over 50 sharks. Admission fees are: adults, US\$15.95; seniors and children, US\$8; family (2 adults and 2 children) US\$39.95. Another wharf area attraction is the **Musée Mecanique**, which contains one of the world's largest privately owned collections of penny arcade games and mechanically operated musical instruments, all of which you can enjoy with plenty of quarters.

**Pier 39** is also the departure point for some of San Francisco's ferries. Popular ferry destinations include Tiburon, Angel Island, and Sausalito. See the Blue and Gold Fleet ([www.blueandgold-fleet.com](http://www.blueandgold-fleet.com), 705-8200), which also offers Bay Cruises. Several companies offer cruises around San Francisco, another is the Red and White Fleet, ([www.redandwhite.com](http://www.redandwhite.com), 673-2900), which leaves from Pier 43 1/2, 673-2900.

**Alcatraz:** [www.nps.gov/alca/index.htm](http://www.nps.gov/alca/index.htm), [www.alcatrazcruises.com/](http://www.alcatrazcruises.com/), 981-7625. This former federal prison and many-time movie location is a popular San Francisco tour. The Alcatraz ferry leaves from Pier 33 near Fisherman's Wharf. There is an interesting cellhouse audio tour with stories of famous escape attempts and great views of San Francisco from the ferry. Current prices for the ferry are US\$26 for adults, US\$16 for children, and US\$24.50 for seniors. It is best to reserve tickets in advance.

**Golden Gate Bridge:** Highway 101 is the road across San Francisco's signature bridge. If you'd like to walk across the bridge or just get a close-up view, there is a pedestrian sidewalk across the bridge, which is 1.7 miles long. Please dress warmly. The San Francisco side of the bridge has a Visitor's Center.

**The Palace of Fine Arts:** 3301 Lyon St., between the Marina and the Presidio. Built for the 1915 Panama-Pacific International Exhibition, the rose-colored San Francisco version of a Roman ruin was so beautiful that the city voted almost immediately to preserve it. It has been undergoing a piece by piece renovation since the 1960s. It overlooks a lagoon filled with swans. Currently it houses the **Palace of Fine Arts Theatre** ([www.palaceoffinearts.org/](http://www.palaceoffinearts.org/)) and the **Exploratorium**, an interactive science museum (see Museum section below.)

**Coit Tower:** This famous landmark stands on Telegraph Hill in Pioneer Park and contains a series of murals showing the history of San Francisco. But that isn't its major attraction. The tower and the park around it offer wonderful views of San Francisco including the Golden Gate Bridge, Alcatraz, Pier 39, Angel Island, Treasure Island, the Bay Bridge, Russian Hill, Lombard St. (world's most crooked street), and Nob Hill. To get there either drive, take a cab, or take the #39 bus from Fisherman's Wharf near Pier 39, which leaves every 20-30 minutes. The **Filbert Steps**, a steep but interesting combination of wood and concrete stairs (around 400 steps), also lead to the top of the Hill but you may want to plan to walk down rather than up. The steps are surrounded by gardens, houses, and lovely views, and are a good place to see the wild parrots of Telegraph Hill. The steps start at the bottom of the hill near the intersection of Sansome and Filbert Sts., not far from the Embarcadero.

**Chinatown:** The Gates to Chinatown are on Grant Avenue at Bush Street. San Francisco's Chinatown is a fascinating place filled with shops, restaurants, temples, herbal markets, and much more.

**Postcard Row:** The row of pastel-painted Victorian houses frequently seen in pictures, television, and movies set in Francisco is located at the edge of the park in Alamo Square at Steiner and Hayes Streets, about one mile west of the Civic Center area.

**Golden Gate Park:** Among the world's greatest urban parks, it is approximately three miles long by a half mile wide, and full of wooded trails, lawns, gardens, and lakes. Special destinations in the park include:

**Conservatory of Flowers:** The oldest wood and glass Victorian-style conservatory in the United States, it contains over 1500 species of plants native to countries all around the world.

**Japanese Tea Garden:** This beautiful, romantic garden originally developed for the 1894 World's Fair, was designed by Makoto Hagiwara who extended it into a permanent feature of the park. It is reputed to be the place where fortune cookies

originated. The **deYoung Museum** and the **California Academy of Sciences** are located in the Park. Museums.

**deYoung Museum**, Golden Gate Park, 50 Hagiwara Tea Garden Dr., [www.famsf.org/deyoung/index.asp](http://www.famsf.org/deyoung/index.asp), 750-3600. Collections include American painting, American sculpture and decorative art, art from MesoAmerica, Central and South America, African art, Oceanic art, pueblo pottery and contemporary craft. Adults, US\$10; seniors, US\$7; youths 13-17 and students, US\$6, children, 12 and under, free. Open Tuesday-Sunday, 9:30 a.m. to 5:15 p.m. Special exhibition is **Tutankhamen and the Golden Age of the Pharaohs**, see [www.tutsanfrancisco.org/](http://www.tutsanfrancisco.org/).

**Legion of Honor**, 34<sup>th</sup> Avenue at Clement St., [www.famsf.org](http://www.famsf.org), 750-2600. Ancient Assyrian, Greek, Roman and Egyptian art, European paintings, sculpture, and decorative art. Auguste Rodin collection. Views of the Golden Gate Bridge and the ocean. Adults, US \$10; seniors, US\$7; youths 13-17, US\$6; children 12 and under, free. Open Tuesday-Sunday, 9:30 a.m.-5:15 p.m. Admission to the Legion counts as same day admission to the de Young Museum.

**Asian Art Museum**, 200 Larkin Street, near the Civic Center, [www.asianart.org](http://www.asianart.org), 581-3500. Chinese, Korean, Japanese, and Southeast Asian collections. Adults, US\$12; seniors, US\$8; students/youths, US \$7; children 12 and under, free. Open Tuesday-Sunday 10:00 a.m.-5:00 p.m., Thursdays until 9:00 p.m.

**Museum of Modern Art**, 151 Third St. (near the W Hotel), [www.sfmoma.org](http://www.sfmoma.org), 357-4000. Modern and contemporary art including photography, painting and sculpture, architecture and design, and media arts. Adults, US\$15; seniors/students US\$9; under 12, free. Half price Thursday evenings. Open Friday-Tuesday, 11:00 a.m.-5:45 p.m., Thursday, 11:00 a.m.-8:45 p.m. Closed Wednesday.

**California Academy of Sciences**, Golden Gate Park, 55 Music Concourse Dr., [www.calacademy.org](http://www.calacademy.org), 379-8000. Natural history museum with a rainforest, a planetarium, and an aquarium. May be the greenest museum on the planet, features a living roof. Adults, US\$24.95; students and youths 12-17, US \$19.95; children under 12, US\$14.95. Open Monday-Saturday, 9:30 a.m.-5:00 p.m., Sunday 11:00 a.m.-5:00 p.m.

**Exploratorium**, 3601 Lyon St. near the Palace of Fine Arts, [www.exploratorium.edu](http://www.exploratorium.edu), 561-0360. "The museum of science, art, and human perception" is a kids' favorite. Open Tuesday-Sunday 10:00 a.m.-5:00 p.m. Adults, US \$14; Students/ Seniors/Youths, US\$11; children, US\$9.

## Miscellaneous/Local Information

### Small Museums near the Convention Center

**Contemporary Jewish Museum**, 736 Mission St., [www.thecjm.org](http://www.thecjm.org), 655-7800. Exhibitions that explore contemporary perspectives on Jewish culture, history, art, and ideas. Exhibit: "There's a mystery there: Sendak on Sendak" until January 19. Adult, US\$10; seniors/students, US\$8; under 18, free. Thursdays after 5:00 p.m., US\$5. Open 11:00 a.m.-5:00 p.m. daily. Closed Wednesday. Open until 8:00 p.m. on Thursday.

**Cartoon Art Museum**, 655 Mission St., [www.cartoonart.org](http://www.cartoonart.org), 227-8666. Exhibits designed to promote a greater appreciation of cartoon and animation art. Adults, US\$6; student/seniors, US\$4; children, US\$2. Open 11:00 a.m.-5:00 p.m. Closed Monday.

**Museum of the African Diaspora**, 685 Mission St. (at 3<sup>rd</sup>), [www.moadsf.org](http://www.moadsf.org), 358-7200. Rotating exhibits from the collections of major museums, some interactive, "using objects of art and culture as catalysts to tell the story of the African Diaspora". Adults, US\$10; seniors/students, US\$5; children under 12, free. Open Wednesday-Friday, 11:00 a.m.-6:00 p.m.

### Other Information:

**TIX Bay Area**, on Powell St.. between Geary and Post, is a walk-up box office selling half-price tickets on the day of performance and full-price tickets in advance to select events. Recorded information: 433-7827. [www.tixbayarea.org/tix\\_booth.jsp](http://www.tixbayarea.org/tix_booth.jsp). Half-price tickets go on sale at 11:00 a.m. all days. Open Tuesday-Friday, 11:00 a.m.-6:00 p.m., Saturday 10:00 a.m.-6:00 p.m., Sunday 10:00 a.m.-3:00 p.m.

**Symphony: George Benjamin conducts the San Francisco Symphony**, Thursday, January 14 , at 2:00 p.m., January 15-16 at 8:00 p.m. Davies Symphony Hall, 201 Van Ness Avenue, (near Civic Center), [www.sfsymphony.org](http://www.sfsymphony.org). "The magnetism of French composers of the 20th century will draw you into this program. Experience the charm of Ravel's Mother Goose Suite, the exoticism of his Rapsodie espagnole, and the birds singing in Messiaen's Oiseaux exotiques. This program also features two works by Messiaen's favorite student, George Benjamin." Tickets are US15-135; call 864-6000.

**Cirque du Soleil**, OVO in San Francisco, AT&T Park, see [www.cirquedesoleil.com/en/shows/ovo/tickets.aspx](http://www.cirquedesoleil.com/en/shows/ovo/tickets.aspx).

### Shopping

The **Union Square** area, roughly between Kearny St.. and Mason St.. (east to west), and Bush to Market St./Mission St.. (north to south), is

one of San Francisco's principal shopping districts. Nearly every major store is represented here along with a multitude of smaller boutiques. The **Westfield San Francisco Shopping Centre** at 865 Market St.., is a new and vast galleria anchored by Bloomingdales and Neiman Marcus.

The **Ferry Building** at the end of Market Street along the Embarcadero, [www.ferrybuilding.marketplace.com](http://www.ferrybuilding.marketplace.com), offers cafés, restaurants, and all kinds of gourmet groceries and food-related items. The farmer's markets on Tuesday, Thursday, and especially Saturday, are renowned.



### Smoking

Moscone West is a nonsmoking building. Smoking is strictly prohibited in all areas, including loading docks, service corridors, etc. at all times. Smokers may only smoke in an area that is located 20 feet away from the entrance. Look for smoke ash urns. There is also an area on level three to get fresh air.

The San Francisco Marriott is a nonsmoking hotel. Smoking is permitted near the Mission St.. valet entrance (look for the smoker urns and benches) or in the Yerba Buena Gardens across the street.



### Speaker Information

Speakers who cannot present their papers should contact the program coordinator in the AMS office (800-321-4267, ext. 4146). Standard equipment in all session rooms is one overhead projector, a laptop projector (laptops are the responsibility of the speaker), and screen. Invited 50-minute speakers are automatically provided with two overhead projectors and laptop projection. White/blackboards are not available.

Requests for additional equipment made at the meetings most likely will not be granted because of budgetary restrictions. Unfortunately no audio-visual equipment can be provided for committee meetings, other meetings, or gatherings not on the scientific program.

Speakers wishing to prepare transparencies in advance of their talk will find the necessary materials available at a modest charge at the Transparencies section of the Registration Desk.



### Student Information

Students may gather in the Student Hospitality/Information Center located on the second level of Moscone West near the Main Lecture Room. The center will be open 9:00 a.m. to 5:00 p.m. Wednesday through Friday, and 9:00 a.m. to 2:00 p.m. on Saturday.



### Survey

Your opinions are important to us! Be sure to fill out the online JMM10 Participant Survey either during the meeting or after. You can access this survey by going to the meetings page at [www.ams.org/amsmtgs/2124\\_intro.html](http://www.ams.org/amsmtgs/2124_intro.html) and clicking on SURVEY.



### Travel/Transportation

#### Travel/Transportation

**Travel to Moscone Convention Center:** Moscone West, part of the Moscone Convention Center ([www.moscone.com](http://www.moscone.com)) is located at Fourth and Howard Streets. The address is 800 Howard Street, San Francisco, 94103. General driving directions are listed at [www.moscone.com/directions/driving.shtml](http://www.moscone.com/directions/driving.shtml). Consult your preferred Internet mapping site for more specific directions. The parking map located at [www.moscone.com/pdf/MosconeParkingMap.pdf](http://www.moscone.com/pdf/MosconeParkingMap.pdf) is helpful for reference for the immediate area.

Moscone West is accessible via San Francisco's public transit systems, BART (Bay Area Rapid Transit, [www.bart.gov](http://www.bart.gov), see system map at <http://bart.gov/stations/index.aspx>, and MUNI, [www.sfmta.com](http://www.sfmta.com), see map at [http://transit.511.org/static/providers/maps/SF\\_712200722226.pdf](http://transit.511.org/static/providers/maps/SF_712200722226.pdf). The BART/MUNI station for Moscone West is **Powell Street**. The station close to the Hotel Whitcomb and the Holiday Inn Civic Center is Civic Center, one stop down from Powell St..

If you are traveling within California in an area serviced by Caltrain, [www.caltrain.com](http://www.caltrain.com), the San Francisco station at Fourth and Townsend is approximately three-quarters of a mile from Moscone Center. See the map at [http://www.caltrain.com/caltrain\\_map.html](http://www.caltrain.com/caltrain_map.html), it runs through towns between San Jose and San Francisco.

**Cable cars:** Two of San Francisco's famous cable car lines stop near the Parc 55 and Powell Hotels, the Powell-Mason Line and the Powell-Hyde line. Both go down to the waterfront. See the "Sightseeing" section.

**Traveling from the airports:** San Francisco is on Pacific Standard Time and is conveniently served by two local airports: San Francisco International Airport (SFO), which is thirteen miles southeast of Moscone Center; and Oakland (OAK), which is nineteen miles slightly southeast.

Terminal maps of each airport can be found online: San Francisco International Airport at [www.flysfo.com/web/page/as\\_airportmaps.htm](http://www.flysfo.com/web/page/as_airportmaps.htm) and Oakland International Airport (OAK) Terminal 1 Map at [www.flyoakland.com/terminal\\_1\\_map.html](http://www.flyoakland.com/terminal_1_map.html) and Terminal 2 map at [www.flyoakland.com/terminal\\_2\\_map.html](http://www.flyoakland.com/terminal_2_map.html).

#### Driving from the airports to Moscone Center

**From SFO:** Take the free AirTrain blue line to get to the rental car center. The address of the airport is 1 McDonnell Rd., San Francisco, CA 94128 (for [www.mapquest.com](http://www.mapquest.com)) or S. McDonnell Rd. & S. Link Rd., San Francisco, CA 94128 (for [maps.yahoo.com](http://maps.yahoo.com)) or go to [www.visitingdc.com/maps/san-francisco-airport-directions.asp](http://www.visitingdc.com/maps/san-francisco-airport-directions.asp) and insert your desired destination address. Take Route 101 North, then I-80 East. Exit at Fourth Street. Take a left on Bryant, a left on Third, and a left at Howard Street. Moscone West is at Fourth and Howard. To drive to your hotel, see the hotel page s for its specific address.

**From OAK:** In Oakland, there is a rental car shuttle that operates every ten minutes; however, it operates on demand between 1:30 a.m. and 4:30 a.m. The address of the airport is 1 Airport Dr., Oakland, CA 94621. Head southeast on Airport Drive and stay to the right. Take I-880 North toward Oakland. Merge onto I-80 West to San Francisco. Exit onto Fremont Street and turn left at Howard Street. Moscone West is at Fourth and Howard. To drive to your hotel, see the hotel page for its specific address.

#### Public Transportation from the Airports

**SFO:** The San Francisco Airport BART Station is located on the Departures/Ticketing Level of the International Terminal (Boarding Area G side). Take the free AirTrain to the Garage G/BART Station stop. The BART fare from SFO to the Powell Street station is approximately US\$8.

**OAK:** The nearest BART station is Coliseum/Oakland Airport Station. AirBart operates between the Coliseum/Oakland Airport station and Oakland Airport every 10 minutes. Service on weekdays and Saturdays is 5:00 a.m. to midnight; 8:00 a.m. to

## Miscellaneous/Local Information

midnight on Sundays and holidays. The shuttle stop for AirBart is located between Terminal 1 & 2 at Oakland Airport's third curbside. The fare for AirBart is US\$3; Seniors, children (under 12), and the disabled are US\$1. The public bus system, AC Transit ([www.actransit.com](http://www.actransit.com)) also provides transportation from the airport to the Coliseum/Oakland Airport BART station via the 50 and 805 lines. The 805 is a late night service, running hourly starting at 1:25 a.m. The fare on BART from Coliseum/Oakland Airport to Powell Street is US\$3.80.

### Taxis and Shuttles

**Taxi:** One-way taxi fare to the San Francisco Marriott Hotel is approximately US\$40 from SFO and US\$51 from OAK.

**SuperShuttle:** [www.supershuttle.com](http://www.supershuttle.com). The fare to the San Francisco Marriott Hotel in a nine-passenger shared van is US\$17 per person from SFO and US\$27 (for the first passenger; additional passengers are US\$15 in shared van) from OAK.

### Discounted Car Rental

**Avis Rent A Car** is the official car rental company for the meetings. Depending on variables such as location, length of rental, and size of vehicle, Avis will offer participants the best available rate which can range from 5%-25% discount off regular rates. Participants must use the assigned Meeting Avis Discount Number (J098887) and meet Avis rate requirements to receive the discount. (Rate

discounts are available at all corporate and participating licensee locations.) Reservations can be made by calling 1-800-331-1600 or online at [www.avis.com](http://www.avis.com).

All car rentals include unlimited free mileage and are available to renters 25 years and older. Renters must also meet Avis's driver and credit requirements. Return to the same rental location or additional surcharges may apply. Rates do not include any state or local surcharges, tax, optional coverages, or gas refueling charges.



### Videotaping

The videotaping of any Joint Mathematics Meetings sponsored events, including but not limited to Invited Addresses, Colloquia, Minicourses, Special Sessions, Short Courses, Contributed Paper Sessions, and Workshops is strictly forbidden without the explicit written permission of the Director of Meetings. Ask at the Registration Desk.



### Weather

In January in San Francisco you will find average daily high and low temperatures between 58°F and 46°F. January also sees more rain than any other month of the year. Please plan accordingly. Visit your favorite weather site for up-to-the-minute forecasts, or see [www.usatoday.com/weather/default.htm](http://www.usatoday.com/weather/default.htm).

## Where Your Registration Dollars Go

The AMS and MAA make every effort to keep participant expenses at meetings and registration fees for meetings as low as possible. We work hard to negotiate the best hotel rates and to make the best use of your registration dollars to keep the meeting affordable for you. When you pay the registration fee, you are helping to support a wide range of activities associated with planning, organizing, and running a major meeting of this size.

Planning involves such activities as site selection which begins more than five years before the meeting. This encompasses looking for the best hotel and convention center facilities at reasonable rates. The staff also attends to the needs of other organizations, such as the Association for Symbolic Logic, the Association for Women in Mathematics, and the National Association of Mathematicians. Processing over 2000 abstracts and scheduling all sessions, speakers, over 100 committee meetings, and more than 50 social events requires a great deal of precise planning and coordination. These activities along with the production and printing of the meetings program and timetable, the handling of over 4,000 advance registrations, making over 2,000 hotel reservations, preparing badges for advance registrants, and the mailing of advance registration materials are just a part where your registration dollar goes. At the meeting site some of the major expenses are room rental, audiovisual equipment and services, the email center, and support personnel (such as freight handlers and typists).

While the AMS and MAA work hard to make the best use of registration dollars and keep the meetings affordable, your suggestions on how to keep costs down are welcome. While at the meeting please enter your comments in the log at the Transparencies section of the Registration Desk. After the meeting is over, you may forward your suggestions to the Director of Meetings at [pop@ams.org](mailto:pop@ams.org).

## Official Hotels of the Joint Mathematics Meetings.

The deadline for making reservations at specially negotiated rates has expired.  
Participants should call for current rates and availability.

### How to Obtain Hotel Accommodations – 2010 JMM

#### General Instructions

Participants must register in advance in order to obtain hotel accommodations through the Mathematics Meetings Service Bureau (MMSB). Special rates have been negotiated exclusively for this meeting at the following hotels: the San Francisco Marriott, the Intercontinental San Francisco, the W Hotel San Francisco, the Serrano Hotel, the Parc 55 Hotel San Francisco, the Handlery Union Square, the Holiday Inn Civic Center, the Powell Hotel, the Hotel Mark Twain, and the Hotel Whitcomb. Reservations must be made through the MMSB to receive these rates. These hotels can ONLY start accepting reservations directly after December 22<sup>nd</sup>, at which time rooms and rates will be based on availability; higher rates will be applied to any rooms reserved directly with these hotels at the JMM rates before December 22<sup>nd</sup>.

**To make a reservation**, please submit a completed housing section of the Advance Registration/Housing (ARH) Form (via paper or the web) by **November 18**. If you use the web, you will be required to supply a credit card to reserve your room. If you submit a paper form, you will need either a credit card number or a check deposit for one night's stay. **Sorry, reservations cannot be taken by phone.** The web form can be found at [www.ams.org/meetreg?meetingid=2124](http://www.ams.org/meetreg?meetingid=2124). The paper form can be found at the back of this announcement. Participants interested in suites should contact the MMSB directly at mmsb@ams.org or 1-800-321-4267 ext. 4137 or 4144 for further information.

#### Confirmations

The Marriott, the Intercontinental, the Holiday Inn Civic Center, and the Hotel Whitcomb will be sending email confirmations. The other hotels will not send separate hotel confirmations. You may contact the MMSB after December 21 if you would like to receive your confirmation number.

#### ADA Accessibility

All hotels are in compliance with ADA, and most have auxiliary aids and services available on request and

- Credit cards: Visa, MC, AMEX, Diners, and Discover.

#### Cancellation Policies

- (cancellation without penalty)
- Marriott, W Hotel, Serrano, Parc 55, Handlery, Powell, Holiday Inn: 72 hours before arrival
  - Mark Twain: 48 hours before arrival
  - Intercontinental and Whitcomb: 24 hours before arrival

#### Check-in/Check-out

Check-in at Marriott is 4:00 p.m.; check-in at the Powell is 2:00 p.m. Check-in at all other hotels is 3:00 p.m. Check-out at all hotels is 12:00 p.m.

#### Internet Access/Wireless

- Marriott:** Complimentary wireless internet on the first floor, by Starbucks, the bar and around the corner in the secluded seating area, as well as upstairs in the restaurant; wired/wireless in guest rooms for a daily rate of US \$12.95
- Parc 55:** Wireless internet in lobby and public areas for a daily rate of US \$12.95, and wired/wireless in guest rooms for a daily rate of US \$12.95 (same fee covers both areas)
- W Hotel and Intercontinental:** Complimentary wireless internet in lobby; wired/wireless in guest rooms for a daily rate of US \$14.95
- Handlery:** Wireless internet access in lobby and public spaces for a daily rate of US \$9.95, and in guest rooms for a daily rate of US \$9.95 (same fee covers both areas).
- Mark Twain:** Wireless/wired internet available in guest rooms for a daily rate of US \$9.95. Internet available in lobby kiosk for US \$3.00 for 15 minutes; US \$6.00 for 45 minutes
- Serrano Hotel:** Complimentary wireless internet access in public spaces; complimentary wireless internet in guest rooms with Kimpton In-Touch sign up at [www.kimptonhotels.com/intouch/KIT\\_overview.aspx](http://www.kimptonhotels.com/intouch/KIT_overview.aspx)
- Holiday Inn, Powell Hotel, Hotel Whitcomb:** Complimentary wireless internet available in all guest rooms, lobby and public areas

#### Deadlines

- |                                     |         |
|-------------------------------------|---------|
| Complimentary Room Drawing:         | Nov. 4  |
| Reservations through MMSB:          | Nov. 18 |
| Changes/Cancellations through MMSB: | Dec. 14 |

#### Complimentary Room Drawing

Anyone who reserves a room through the MMSB by **November 4** is eligible for a drawing to receive complimentary room nights during the meeting. See *How to Register in Advance* for details.

#### Environmental Policies

The majority of the hotels have successful “green” programs in place. Since 2004 Marriott has been awarded more ENERGY STAR labels than any other hotel company. In addition, the Parc 55 has received an ENERGY STAR label, the Intercontinental is working towards being LEED green-certified, the Hotel Whitcomb is considered a ‘green’ hotel, and the Serrano’s Kimpton EarthCare program is nationally recognized. See page on “Green Efforts at the JMM” for details.

#### Rates

- Subject to a 15.5% state tax/TID tax.
- Only certified students or unemployed mathematicians qualify for student rates.
- See the Advanced Registration/Housing (ARH) Form for a detailed breakdown of rates for each hotel.

#### Guarantee Requirements

- One night deposit by check, or

## Miscellaneous/Local Information

<b>Marriott San Francisco (hdqtrs, ~1.5 blocks from Moscone West)</b>	<b>Intercontinental San Francisco (~1.5 blocks from Moscone West)</b>	<b>W Hotel San Francisco (~1.5 blocks from Moscone West)</b>	<b>Serrano Hotel (~5 blocks from Moscone West)</b>
55 Fourth Street San Francisco, CA 94103 415-896-1600 Single/Double: US \$175 Student Single/Double: US \$140	888 Howard Street San Francisco, CA 94103-3011 415-616-6500 Single/Double: US \$175 Student Single/Double US \$140	181 Third Street San Francisco, CA 94103 415-777-5300 Single/Double: US \$169 Student Single/Double: US \$140	405 Taylor Street San Francisco, CA 94102 415-885-2500 Single/Double: US \$160
Smoke-free hotel. Restaurants: Bin 55, Fourth St. Bar & Deli, Mission Steak House, The View (bar), and Starbucks. Fitness center; Indoor pool; Spa services available; Business center; Full amenities in guest rooms; In-room safe; Children under 18 free in room with an adult; Cribs available upon request at no charge. Pets allowed with US \$50 non-refundable fee (pets cannot be left unattended in guest room). Valet parking only for registered guests for US \$55.86 per day. <b>Confirmations sent by email only.</b>	Smoke-free hotel. Restaurant: Luce. Fitness center (24 hrs); Indoor pool; Spa services available; Business center; Full amenities in guest rooms; In-room safe; Children under 18 free in room with an adult; Cribs available upon request at no charge. Pets allowed with US \$50 non-refundable fee (pets cannot be left unattended in guest room). Valet parking only for registered guests for US \$55.86 per day. <b>Confirmations sent by email only.</b>	Non-smoking hotel. Restaurants: W Café, XYZ, XYZ Bar, Fitness center; Heated indoor pool; Spa services available; Business center; Full amenities in guest rooms including CD/DVD player; In-room safe; Children under 18 free in room with an adult; Cribs available upon request at no charge. Pets allowed (dogs and cats), contact directly for additional information and fees. Valet parking only for registered guests for US \$45 per day plus tax. Hybrids US \$22.50 per day plus tax. <b>No separate hotel confirmations will be sent.</b>	Smoke-free hotel. Restaurant: Ponzu (next to Serrano Hotel). Fitness center; Spa services available; Business center (24 hrs); Full amenities in guest rooms; In-room safe; Children under 18 free in room with an adult; Cribs available upon request at no charge. Pet-friendly hotel. Valet parking with unlimited in-and-out privileges is US \$39.95 plus tax per day (oversized vehicles \$49.95). Hybrids 25% off overnight parking. <b>No separate hotel confirmations will be sent.</b>
<b>Parc 55 Hotel San Francisco (~2.5 blocks from Moscone West)</b>	<b>Handlery Union Square Hotel (~5 blocks from Moscone West)</b>	<b>Holiday Inn Civic Center (~5 blocks from Moscone West)</b>	<b>The Powell Hotel (~2.5 blocks from Moscone West)</b>
55 Cyril Magnin Street San Francisco, CA 94102 415-392-8000 Single/Double: US \$152 Student Single/Double: US \$135	351 Geary Street San Francisco, CA 94102 415-781-7800 Single/Double: US \$146 Student Single/Double US \$136	50 Eighth Street San Francisco, CA 94103 415-626-6103 Single/Double: US \$120 Student Single/Double: US \$110	28 Cyril Magnin Street San Francisco, CA 94102 415-398-3200 Single/Double: US \$110 Student Single/Double: US \$99
Restaurants: Cityhouse Steakhouse, Cityhouse Bar, Barbary Coast, Siam Thai, Fitness center (24 hrs); Business center; Full amenities in guest rooms; In-room safe; Windows open in rooms; Children under 13 free in room with an adult; Cribs available upon request at no charge. Pets allowed starting July 2009. On-site, covered valet parking with unlimited in-and-out privileges for US \$38 per day plus tax (oversized vehicles US \$47). <b>No separate hotel confirmations will be sent.</b>	Restaurants: "The Daily Grill." Outdoor heated pool; Business center; Full amenities in guest rooms; In-room safe; Children under 14 free in room with an adult; Cribs available upon request at no charge. Pets under 20 lbs allowed with a daily fee of US \$75 plus tax. Self-parking in indoor 24-hour garage for \$29 per day plus tax. <b>Confirmations sent by email only.</b>	Restaurants: 50 <sup>th</sup> Eight Bar and Lounge. Fitness center; Outdoor heated pool; Business Center (24 hrs); Full amenities in guest rooms; In-room safe; Windows open in all rooms with balconies; Children under 18 free in room with an adult; Cribs available upon request at no charge. Pets under 20 lbs allowed with a daily fee of US \$75 plus tax. Self-parking in indoor 24-hour garage for \$29 per day plus tax. <b>Confirmations sent by email only.</b>	Smoke-free hotel. Restaurant: Jazz Bistro. No room service. No business center, but there is a computer kiosk in the lobby with a printer available free of charge. ClubOne health clubs day pass/discount available for guests. Full amenities in guest rooms; Safety deposit boxes behind front desk; Windows open in all rooms; Children under 12 free in room with an adult; Playpens (not cribs) available. Pets allowed with a deposit against damages and a liability waiver. Valet parking only for US \$35.34 per day with in-and-out privileges. <b>No separate hotel confirmations will be sent.</b>

Hotel Mark Twain (7 blocks from Moscone West)	Hotel Whitcomb (~5 blocks from Moscone West)	Hostels
<p>345 Taylor Street San Francisco, CA 94102 415-673-2332 Single/Double: US \$99</p> <p>No smoking hotel. Restaurants: Market Street Grill, The Tavern Piano Bar, and Starbucks. Small fitness center (24 hrs); Business center; Full amenities in guest rooms; In-room safe; Children under 17 free in room with an adult; Cribs available upon request at no charge. Valet parking only, with unlimited access, is available for US \$28 plus tax. <b>Confirmations sent by email only.</b></p>	<p>1231 Market Street San Francisco, CA 94103 415-626-8000 Single/Double: US \$99</p> <p>No smoking hotel. Restaurants: Market Street Grill, The Tavern Piano Bar, and Starbucks. Small fitness center (24 hrs); Business center; Full amenities in guest rooms; In-room safe; Children under 17 free in room with an adult; Cribs available upon request at no charge. Valet parking only, with unlimited access, is available for US \$25 plus tax. <b>Confirmations sent by email only.</b></p>	<p><b>The Adelaide</b> (.8 mile from Moscone West) 5 Isadora Duncan Street San Francisco, CA 94102 415-359-1915 Email: info@adelaidehostel.com Website: www.adelaidehostel.com Range: US \$17-70</p> <p><b>Hostelling International San Francisco City Center</b> (.8 mile from Moscone West) 685 Ellis Street San Francisco, CA 94109 415-474-5721 Email: sfcitycenter@norcalhostels.org Website: www.sfhostels.com Range: US \$23-100 (Complimentary wireless)</p> <p><b>Hostelling International Fisherman's Wharf</b> (.2 miles from Moscone West) 240 Fort Mason San Francisco, CA 94123 415-771-7277 Email: fannec@norcalhostels.org Website: www.sfhostels.com Range: US \$26-125 (Complimentary wireless)</p> <p><b>USA Hostels San Francisco</b> (~1 mile from Moscone West) 711 Post Street San Francisco, CA 94109 877-483-2950 Email: marketing@usahostels.com Website: www.usahostels.com Range: US \$29-90</p> 

## Miscellaneous/Local Information — Restaurant Guide



# Restaurant Guide

San Francisco is full of excellent restaurants. The following brief selection is from the neighborhoods around the Moscone Center. Most of this

## Approximate price chart for entrées:

<b>\$</b>	<b>US\$14 and under</b>
<b>\$\$</b>	<b>US\$15-24</b>
<b>\$\$\$</b>	<b>US\$25-34</b>
<b>\$\$\$\$</b>	<b>US\$35 and up</b>

list courtesy of the San Francisco CVB. *Will the San Francisco CVB have people onsite?* For more information, the following websites are helpful: [www.onlyinsanfrancisco.com/groups/jmm.asp](http://www.onlyinsanfrancisco.com/groups/jmm.asp), [www.sfgate.com/food/top100/](http://www.sfgate.com/food/top100/), and [www.zagat.com](http://www.zagat.com). The area code in San Francisco is 415. Please note that restaurant hours are subject to change.

**1. Amber India Restaurant**, SOMA/Yerba Buena, *Indian*, 25 Yerba Buena Lane, 777-0500, [www.amber-india.com](http://www.amber-india.com). A top-rated Indian restaurant offering primarily North Indian cuisine with a great ambiance and service to match. Also an excellent bar. Lunch, Dinner daily. \$\$

**2. ame**, Yerba Buena, *American*, 689 Mission St., 284-4040, [www.amerestaurant.com](http://www.amerestaurant.com). Elegant dining with a menu of seasonal new American cuisine, including an assortment of offerings from the restaurant's striking sashimi bar. Private dining available. Dinner nightly 5:30 p.m.-10:00 p.m. \$\$\$

**3. Annabelle's Bar & Bistro**, Union Square, *Californian*, 68 4th St., 777-1200, [www.annabellles.net](http://www.annabellles.net). Conveniently located downtown between Union Square and The Moscone Center. Serving California cuisine with a focus on local, organic, sustainably raised ingredients.

Open daily 11:30 a.m.-10:30 p.m. Bar menu served until midnight. \$\$

**4. B Restaurant and Bar**, Yerba Buena, *Californian*, 720 Howard St., 495-9800, [www.bsanfrancisco.com](http://www.bsanfrancisco.com). California bistro and bar perched atop the Yerba Buena Gardens waterfall, with a tantalizing view of downtown San Francisco. Upholstered vintage chairs, 20-foot concrete bar and rustic stone walls, surrounded by floor-to-ceiling glass walls. Lunch, Monday-Friday 10:30 a.m.-2:30 p.m.; dinner, Monday-Saturday 5:30-10:00 p.m.; breakfast, Saturday-Sunday 10:30 a.m.-3:00 p.m. \$\$

**5. Beard Papa Sweets Cafe**, Yerba Buena, *Desserts*, 99 Yerba Buena Lane, 978-9972, [www.beardpapasf.com](http://www.beardpapasf.com). Making one of the world's best cream puffs. Monday-Saturday, 10:00 a.m.-8:00 p.m.; Sunday until 6:00 p.m. \$

**6. Boudin Bakery & Cafe**, Yerba Buena/Union Square, *Brasserie/Cafe*. Two locations: 619 Market St., and 170 O'Farrell St., 281-8200. [www.boudinbakery.com](http://www.boudinbakery.com). San Francisco's world famous sourdough French bread, hearty sandwiches, bread bowl soups, entrée salads, abundantly topped sourdough pizzas, freshly baked pastries and desserts. Monday-Friday, 6:30 a.m.-7:00 p.m.; Saturday, 8:30 a.m.-4:00 p.m. Closed weekends \$

**7. Buca di Beppo**, Yerba Buena, *Italian/Northern Italian*, 855 Howard St., 543-7673, [www.bucadibeppo.com](http://www.bucadibeppo.com). Serving real southern immigrant Italian food on platters meant for sharing in a kitschy and fun environment. Lunch, and dinner, Monday-Thursday 11:00 a.m.-10:00 p.m., Friday until 11:00 p.m., Saturday noon-11:00 p.m., Sunday noon-10:00 p.m. \$\$

**8. California Pizza Kitchen**, Yerba Buena, *Californian*, 53 Third St., 278-0443, [www.cpk.com](http://www.cpk.com). Home to the original BBQ chicken pizza with a variety of hearth baked pizzas, made-to-order pastas, creative salads, and delicious desserts. Lunch and dinner daily, 11:00 a.m.-10:00 p.m. \$

**9. The Cheesecake Factory Restaurant**, Union Square, *American*, Macy's Union Square, 251 Geary St, 8th Floor, 391-4444, [www.thecheesecakefactory.com](http://www.thecheesecakefactory.com). Offering 200 menu selections including 50 cheesecakes and desserts, there is "something for everyone." Open daily for lunch, dinner, late night dining and take-out. Breakfast, Lunch, Dinner Sunday-Thursday 11:00 a.m.-11:00 p.m., Friday-Saturday until 12:30 p.m., Breakfast Sunday 10:00 a.m.-2:00 p.m. \$\$

**10. Chevy's Fresh Mex**, Yerba Buena, *Mexican*, 201 3rd St., 543-8060, [www.chevys.com](http://www.chevys.com). Not a smashed beans and rice place, Chevy's stands out with fresh traditional and regional Mexican food, complemented with fabulous margaritas in frozen mugs, and set in a lively border-style atmosphere. Lunch and dinner daily, 11:00 a.m.-10:00 p.m.; Friday-Saturday until 11:00 p.m. \$



## Miscellaneous/Local Information — *Restaurant Guide*

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- 11. Chez Papa Resto**, Yerba Buena, *Southern French*, 4 Mint Plaza (414 Jessie St.), 546-4134. [www.chezpapasf.com](http://www.chezpapasf.com). A San Francisco Chronicle top 100 choice, good value prix fixe dinner menu. Lunch 11:30 a.m.-2:30 p.m. Monday-Friday; 11:00 a.m.-3:00 p.m. Saturday; dinner 5:30-10:00 p.m. \$\$\$-\$ \$\$
- 12. Chill**, Union Square, *Desserts*, 125 Kearny Street, 433-1233, [www.chilldesserts.com](http://www.chilldesserts.com). Specialty dessert café offering exotic, all natural, premium frozen yogurt, toppings, desserts and savory crepes along with organic coffee, red tea lattes and artisan pastries and drinks. Open Monday-Friday, 8:30 a.m.-6:00 p.m., Saturday-Sunday, noon-5:00 p.m. \$
- 13. Chipotle Mexican Grill**, Yerba Buena, Mexican, 126 New Montgomery St., 512-8113, [www.chipotle.com](http://www.chipotle.com). Serves gourmet burritos, tacos and "bols" made to order while you wait from top ingredients including Niman Ranch carnitas, house-made guacamole and fresh salas. Eat in or take out. Monday-Friday 10:30 a.m.-9:00 p.m., Saturday 11:00 a.m.-5:00 p.m., closed Sunday \$
- 14. Ducca**, Yerba Buena, *Italian/Northern Italian*, The Westin San Francisco Market Street, 50 3rd St., 977-0271, [www.duccasf.com](http://www.duccasf.com). An Urban Venetian Mecca in the heart of San Francisco, featuring Northern Italian cuisine, a lively patio and space for private dining. Breakfast daily, 6:30-10:30 a.m.; lunch daily, 11:30 a.m.-2:30 p.m.; dinner, Sunday-Thursday, 5:30 p.m.-10:00 p.m., Friday-Saturday 5:30 p.m.-10:30 p.m. \$\$
- 15. Fifth Floor Restaurant**, Yerba Buena, *French*, Hotel Palomar, 12 Fourth St., 348-1555, [www.fifthfloorestaurant.com](http://www.fifthfloorestaurant.com). The redesigned Fifth Floor Restaurant features a new French menu by Chef Laurent Manrique and over 1,500 wines selected by Master Sommelier Emily Wines. Breakfast, Monday-Friday, 7:00-10:30 a.m.; Saturday-Sunday, 8:00 a.m.-11:00 a.m.; dinner, Monday-Saturday, 5:30 p.m.-10:00 p.m. Café: Sunday-Thursday, 5:30 p.m.-10:00 p.m., Friday-Saturday, until 11:00 p.m. \$\$\$
- 16. First Crush Restaurant**, Wine Bar & Lounge, Union Square, *American*, 101 Cyril Magnin, 982-7874. [www.firstcrush.com](http://www.firstcrush.com). Features innovative American French cuisine and over 400 California wines with more than 30 wines by the glass or by the flight! A Wine Spectator Award of Excellence for six years running. Dinner, Sunday-Wednesday, 5:00 p.m.-10:45 p.m.; Thursday-Saturday until 11:30 p.m. \$\$
- 17. Hana Zen Yakitori and Sushi Bar, Union Square**, Japanese, 115 Cyril Magnin, 421-2101. [www.hanazenrestaurant.com](http://www.hanazenrestaurant.com). Delicacies cooked on a special Yakitori grill; sushi bar. Sunday-Thursday, 11:30 a.m.-midnight; Friday-Saturday until 1:00 a.m. \$\$\$-\$ \$\$\$\$
- 18. Jillian's @ Metreon**, SOMA, *Californian*, 101 4th St., Suite 1070, 369-6100. [www.jilliansonline.com](http://www.jilliansonline.com). Savory Californian cuisine served in an exciting upscale atmosphere. Dine while watching the 50-foot video wall. Outdoor dining available. Lunch daily, 11:00 a.m.-4:00 p.m.; dinner nightly, 4:00 p.m.-10:00 p.m.; Friday until 11:00 p.m. \$\$
- 19. Kuleto's Italian Restaurant**, Union Square, Italian/Northern Italian, 221 Powell St., 397-7720, [www.kuletos.com](http://www.kuletos.com). An action-packed restaurant with up-to-date Italian food and one of the most inviting bars in town. Enjoy private dining in one of four beautifully appointed rooms. Breakfast, Monday-Friday, 7:00-10:30 a.m.; Saturday-Sunday, 8:00 a.m.-10:30 a.m.; lunch 11:30 a.m.-5:00 p.m.; dinner nightly, 5:00 p.m.-11:00 p.m. \$\$
- 20. Luce**, SOMA/Yerba Buena, *Californian*, Intercontinental Hotel, 888 Howard St., 616-6566, [www.intercontinentalsanfrancisco.com](http://www.intercontinentalsanfrancisco.com). At Luce, the synergy between wine and food is unparalleled and a tempting menu offers Californian cuisine flavored with nuances of Tuscany. Breakfast daily, 6:00 a.m.-11:00 a.m.; lunch daily, 11:00 a.m.-2:30 p.m.; dinner nightly, 5:00 p.m.-11:00 p.m. \$\$\$
- 21. Restaurant LuLu**, SOMA, *French*, 816 Folsom St., 495-5775, [www.restaurantlulu.com](http://www.restaurantlulu.com). A Provencal French-inspired menu, award-winning interior, outstanding wine selection with over 70 wines by the glass and attentive service define Restaurant LuLu. Lunch Monday-Saturday, 11:30 a.m.-3:00 p.m. and limited menu 3:00-5:30 p.m.; dinner, Sunday-Thursday, 5:30 p.m.-10:30 p.m., Friday-Saturday 5:00-11:30 p.m.; Sunday brunch, 11:30 a.m.-3:00 p.m. \$\$\$
- 22. Masa's**, Union Square, *French*, 648 Bush St.. (at Powell), 989-7154. [www.masasrestaurant.com](http://www.masasrestaurant.com). Nightly dégustation prix-fixe menu, choices might include butternut squash agnolosi, venison with red kuri squash puree, cranberry beans, and huckleberry sauce. Dinner, Tuesday-Saturday, 5:30p.m.-8:30 p.m. \$\$\$\$
- 23. Maya Restaurant**, SOMA, *Mexican*, 303 2nd St., 543-2928, [www.mayasdf.com](http://www.mayasdf.com). Modern Mexican cuisine tantalizes the taste buds. Exotic dining room captures the essence of a Mexican villa, a perfect location for romantic dinner or special celebration. Take-out and lunch menu now available. Lunch, Monday-Friday, 11:30 a.m.-2:00 p.m., Dinner nightly Sunday-Monday 5:00 p.m.-9:00 p.m., Tuesday-Saturday until 10:00 p.m. \$\$\$
- 24. Max's on the Square**, Union Square, *American*, 398 Geary St., 646-8600. [www.maxsworld.com](http://www.maxsworld.com). Max's on the Square has "Everything You Always Wanted to Eat"SM including N.Y. style deli sandwiches, burgers, big and bold salads, dry-aged steaks, grilled fish, pasta and good 'n' gooey desserts. Breakfast daily, 7:00 a.m.-11:30 a.m.; lunch daily, 11:30 a.m.-4:00 p.m.; dinner daily, 4:00 p.m.-10:00 p.m. \$\$
- 25. Mel's Drive-In**, Yerba Buena, *American*, 801 Mission St., 227-4477. [www.melsdrive-in.com](http://www.melsdrive-in.com). Enjoy a piece of Americana. Quality food, quality service and one of the best milkshakes in San Francisco. B, L, D Sunday-Thursday, 6:00 a.m.-1:00 a.m. B, L, D Friday-Saturday, 6:00 a.m.-4:00 a.m. Beer/wine only. \$
- 26. Michael Mina**, Union Square, *American/Californian*, 335 Powell St. (at the Westin St. Francis), 397-9222. [www.michaelmina.net](http://www.michaelmina.net). Celebrity chef Michael Mina dazzles with his trio concept of taking a single ingredient, and creating three to six preparations of it

## Miscellaneous/Local Information —Restaurant Guide

on a single plate. The wine list and the service are as well crafted as the food. Dinner, 5:30 p.m.–9:00 p.m., Sunday–Thursday; Friday–Saturday until 10 pm. \$\$\$\$

**27. Millennium**, Theatre District, *Vegetarian*, 580 Geary St.. (Hotel California), 345-3900. [www.millenniumrestaurant.com](http://www.millenniumrestaurant.com). Gourmet organic vegan restaurant and wine bar, without a formal dress code. Dinner, Sunday–Thursday, 5:30 p.m.–9:30 p.m.; Friday–Saturday, open until 10:00 p.m. \$\$\$\$\$

**28. Oak Room**, Union Square, *American*, 335 Powell St.. (at the Westin St. Francis), 774-0264. [www.westinstfrancis.com/dining/the\\_oak\\_room.cfm](http://www.westinstfrancis.com/dining/the_oak_room.cfm) The Oak Room features traditional American food in an elegant setting. Breakfast, Monday–Friday, 6:30 a.m.–10:30 a.m., Saturday–Sunday until 11:30 a.m.; lunch, 11:30 a.m.–2:00 p.m.; dinner, Monday–Saturday, 5:30 p.m.–9:00 p.m. \$\$\$\$\$

**29. One Market**, Embarcadero, *American*, 1 Market St.., 777-5577, [www.onemarket.com](http://www.onemarket.com). Features the Michelin Star winning farm-to-table food of Chef Mark Dommen, who ably follows in the footsteps of One Market's celebrated founding chef and principal, Bradley Ogden. Lunch, noon–2:00 p.m. daily, Dinner 5:00–10:00 p.m. nightly. \$\$\$

**30. Osha Thai Restaurant**, SOMA/Yerba Buena, *Thai*, 149 2nd St.., 278-9991. [www.oshathai.com](http://www.oshathai.com). The best in traditional Thai cuisine in an elegant space combining traditional and modern Thai design. Each dish is carefully prepared with a balance of flavors, texture and seasoning. Lunch and dinner, Monday–Saturday 11:00 a.m.–11:00 p.m., Sunday 4:30 p.m.–11:00 p.m. \$\$.

**31. Peet's Coffee & Tea**, *Coffeehouses*, [www.peets.com](http://www.peets.com). Two nearby locations: Yerba Buena, 680 Mission St.., 593-8945. Monday–Friday 5:30 a.m.–8:00 p.m.; Saturday–Sunday, 6:00 a.m.–8:00 p.m. **Peet's Coffee & Tea**, SOMA, 595 Mission St.., 495-4323. Monday–Friday, 5:00 a.m.–6:30 p.m.

**32. Ponzu**, Theatre District, *Asian Fusion*, 401 Taylor St.., 775-7979. [www.ponzurestaurant.com](http://www.ponzurestaurant.com). Ponzu offers captivating dishes that bridge the gap between the East and West. Chinese, Japanese, Thai and Vietnamese elements in contemporary presentations described as "perfect to share". Breakfast, Monday–Friday, 6:30 a.m.–10:30 a.m. Not open for lunch. Dinner, Sunday–Thursday, 5:00 p.m.–10:00 p.m., Friday–Saturday until 11:00 p.m. \$\$

**33. PRANA Restaurant**, Yerba Buena, *International*, 540 Howard St.., 978-9942. [www.pranasf.com](http://www.pranasf.com). Adorned with antiquities, Prana offers the diner something special for the eyes and palette. International cuisine in a festive environment. Lunch ,Monday–Friday, 11:00 a.m.–3:00 p.m.; dinner, Tuesday–Thursday, 5:30 p.m.–10:00 p.m.; Friday–Saturday until midnight. \$\$\$

**34. Puccini and Pinetti**, Union Square, *Italian/Northern Italian*, 129 Ellis Street, 392-5500. [www.puccininandpinetti.com/](http://www.puccininandpinetti.com/). An Italian grill and American bar with a simple vision: Combine good food, reasonable prices and a casual atmosphere in a downtown meeting spot.

Pastas and pizzas; take-out available. Lunch and dinner daily, 11:30 a.m.–10:00 p.m.; bar open until midnight. \$\$\$

**35. R&G Lounge**, Chinatown, *Chinese*, 631 Kearny St.., 982-7877. [rnglounge.com](http://rnglounge.com). Name is deceptive, highly reviewed traditional Cantonese cuisine. 11:30 am–9:30 pm daily. \$\$\$\$\$

**36. Roy's Hawaiian Fusion**, Yerba Buena, East/West, 575 Mission St.., 777-0277. [www.roysrestaurant.com](http://www.roysrestaurant.com). Roy's San Francisco is the Bay Area's home of Roy Yamaguchi, the James Beard-winning chef famed for his unique, ground-breaking Hawaiian Fusion cuisine. Lunch, Monday–Friday, 11:30 a.m.–2:00 p.m.; dinner, 5:30 p.m. \$\$\$

**37. Salt House**, SOMA/Yerba Buena, *American*, 545 Mission St.., 543-8900. [www.salthousesf.com](http://www.salthousesf.com). A 75-seat, contemporary tavern housed in an old printing press warehouse built in the 1930s. Serving contemporary American fare and international wines. Lunch, Monday–Friday, 11:30 a.m.–2:00 p.m.; dinner, Monday–Thursday, 5:30 p.m.–11:00 p.m., Friday–Saturday until midnight, Sunday 5:00–10:00 p.m.; café menu Monday–Friday 2:00 p.m.–5:30 p.m. \$\$\$

**38. Samovar Tea Lounge**, Yerba Buena, *International*, 730 Howard St.., 227-9400. [www.samovartea.com](http://www.samovartea.com). Tea culture from around the world. Seasonal, regional, artisanal organic teas and foods served up in beautiful Yerba Buena Gardens. Open daily 9:00 a.m.–9:00 p.m.. No alcoholic beverages. \$.

**39. Sears Fine Food**, Union Square, *American*, 439 Powell Street, 415-986-1160, [www.searsfinefood.com](http://www.searsfinefood.com). World-famous, in the heart of Union Square serving renowned pancakes, homemade pies and local seafood in the evenings. Breakfast daily, 6:30 a.m.–3:00 p.m.; lunch daily, 11:00 a.m.–3:00 p.m.; dinner nightly, 5:30 p.m. until closing. Beer/wine. \$

**40. Starbucks Coffee Company**, Yerba Buena/SOMA *Coffeehouses*, [www.starbucks.com](http://www.starbucks.com). Two nearby locations at 201 3rd St.., 644-0072, and 120 4th St.., 284-0579. Also at the Marriott and the Hotel Whitcomb. Serving some of the finest coffee, handcrafted espresso beverages, Frappuccino® blended beverages and teas. 63 locations throughout San Francisco. Breakfast and lunch daily, 5:30 a.m.–7:00 p.m. No alcoholic beverages. \$

**41. The Slanted Door**, Embarcadero, *Vietnamese*, 1 Ferry Bldg, #3, 861-8032. [www.slanteddoor.com](http://www.slanteddoor.com). "Attempts to recreate the richness of Vietnamese street food and enhance it with western style service, beverages and desserts using the freshest ingredients possible". Lunch, Monday–Saturday , 11:00 a.m.–2:30 p.m., Sunday, 11:00 a.m.–3:00 p.m.; dinner daily, 5:30 p.m.–10:00 p.m. \$\$\$

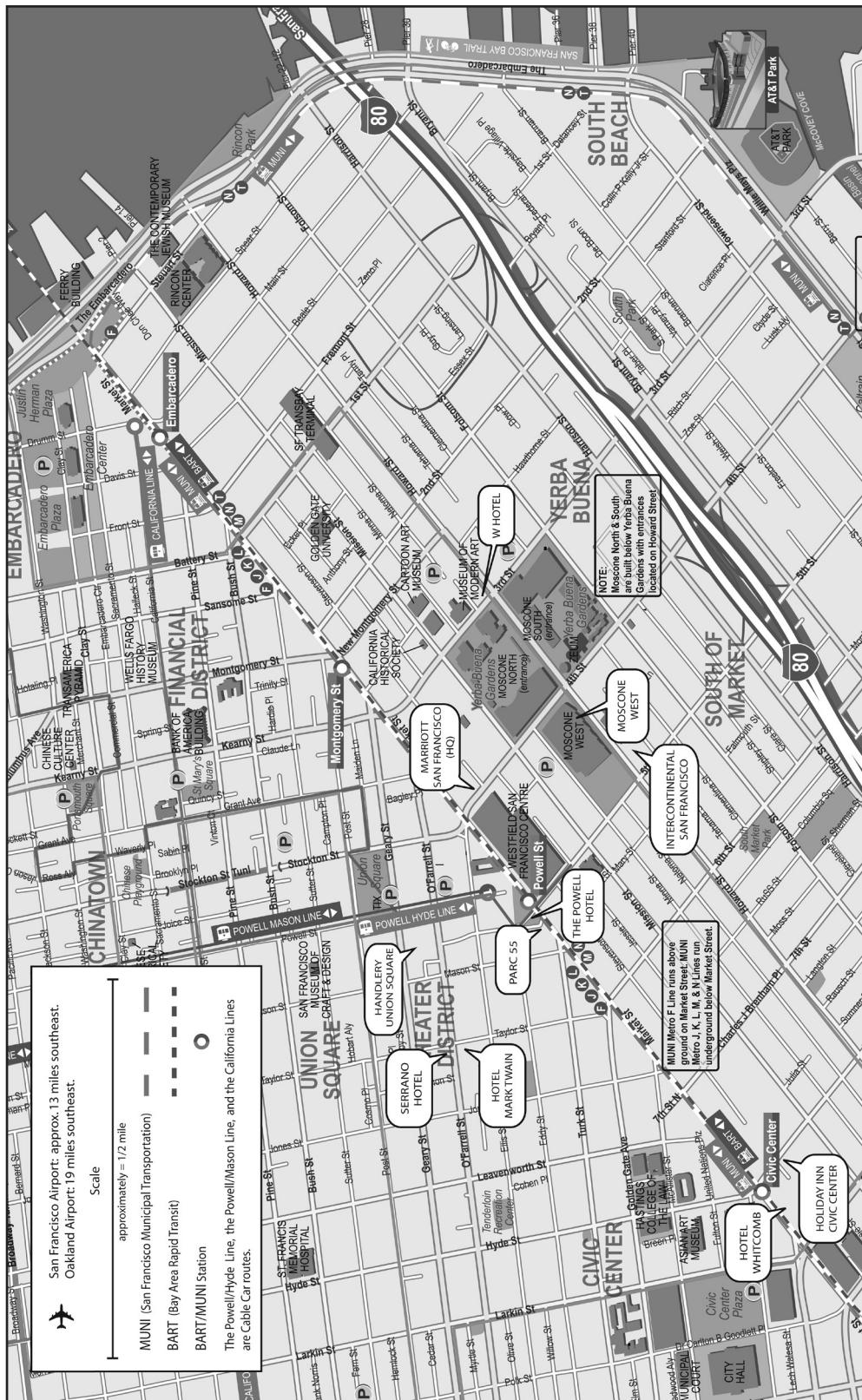
**42. ThirstyBear Brewing Company and Spanish Cuisine**, Yerba Buena, *Brewpubs*, 661 Howard St.., 974-0905. [www.thirstybear.com](http://www.thirstybear.com). Award-winning brewery-restaurant specializes in organic handcrafted beers and Spanish cuisine. Full bar. Monday–Thursday 11:30 a.m.–10:00 p.m., Friday until midnight, Saturday noon–midnight, Sunday 5:00–10:00 p.m. \$

## Miscellaneous/Local Information — *Area Map*

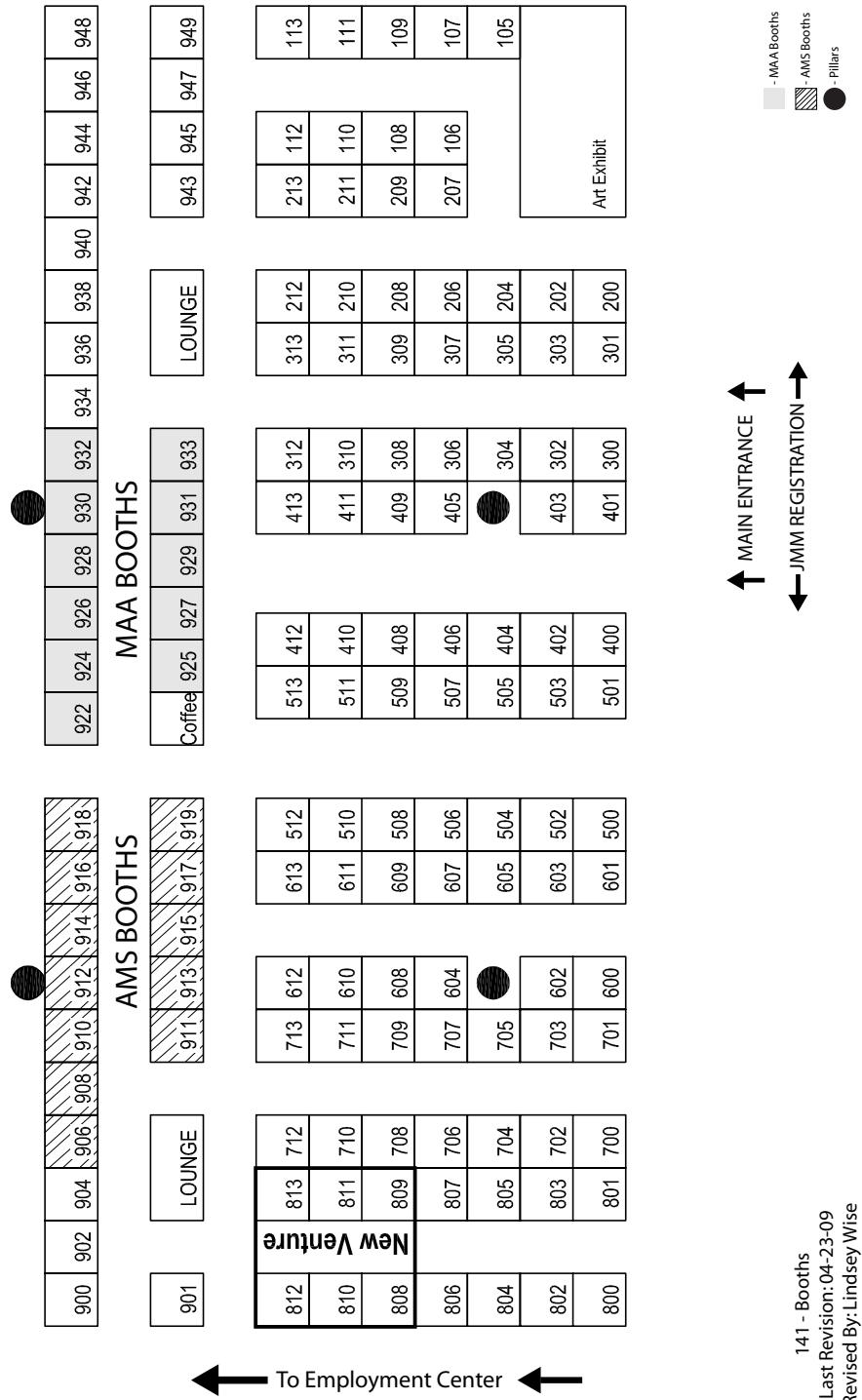
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- 43. Town Hall Restaurant**, SOMA, *American*, 342 Howard St., 908-3900, [www.townhallsf.com](http://www.townhallsf.com). Housed in a 1907 exposed brick warehouse, a bustling, SOMA favorite. Partner/owners Mitchell and Steven Rosenthal and Doug Washington bring you the best of season blended with overtones of Louisiana cuisine. Lunch, Monday–Friday, 11:30 a.m.–2:30 p.m.; dinner, Sunday–Thursday, 5:30–10:00 p.m., Friday–Saturday until 11:00 p.m. \$\$\$
- 44. Tropisueno Mexican Kitchen**, Yerba Buena, *Mexican*, 75 Yerba Buena Lane, 243-0299. [www.tropisueno.com](http://www.tropisueno.com). Authentic Mexican food, fresh seafood and gracious service. Relaxing vacation-like atmosphere. Hand-squeezed margaritas and full bar. Eighty premium tequilas. Lunch daily 10:30 a.m.–5:30 p.m., Dinner nightly 5:30–10:30 p.m. Bar 10:30–12:30 a.m. (closing time varies). \$\$-\$\$.
- 45. Two**, Yerba Buena, *Californian*, 22 Hawthorne Street, [www.two-sf.com](http://www.two-sf.com). California comfort food, anything from a quick salad and pasta to a sophisticated culinary adventure. Local ingredients. Dinner Monday–Thursday 5:30 p.m.–9:00 p.m. Friday–Saturday 5:30 p.m.–10:00 p.m. Closed Sunday \$\$-\$\$.
- 46. 21st Amendment Brewery Cafe**, SOMA, *Brewpubs*, 563 2nd Street, 369-0900, [www.21st-amendment.com](http://www.21st-amendment.com). San Francisco Chronicle says, “a good microbrew selection and good rib-sticking food.” Open daily for lunch, Monday–Saturday at 11:30 a.m.; dinner, Sunday–Saturday until 10:00 p.m.; breakfast, Sunday, 9:30 a.m. Late lunch and late night menus available daily. \$\$
- 47. Vitrine**, Yerba Buena, *American*, St.. Regis Hotel, 125 3rd St., 284-4049. [www.stregis.com/sanfrancisco](http://www.stregis.com/sanfrancisco). Offering a full breakfast and lunch menu with the highest quality ingredients; many of the herbs and vegetables come from the hotel’s organic terrace garden. Breakfast, Monday–Friday, 6:30 a.m.–10:30 a.m. and Saturday–Sunday 7:00–10:30 a.m.; lunch daily 11:30 a.m.–2:00 p.m. \$\$\$
- 48. XYZ**, Yerba Buena, *American*, W San Francisco, 181 Third St., 817-7836. [www.xyz-sf.com](http://www.xyz-sf.com). Modern American cuisine offering unique combinations with market-fresh components, delicately spiced masterpieces. Breakfast, Monday–Friday, 6:30 a.m.–10:30 a.m.; lunch, Monday–Friday, 11:30 a.m.–2:30 p.m.; dinner, Sunday–Thursday, 6:00 p.m.–10:30 p.m. and Friday–Saturday 6:00 p.m.–11:00 p.m.; breakfast, Saturday–Sunday, 8:00 a.m.–2:30 p.m. \$\$\$
- 49. Yank Sing**, Yerba Buena, *Chinese Dim Sum*, [www.yanksing.com](http://www.yanksing.com) Two locations: 49 Stevenson St., 541-4949, and the main location at 101 Spear St., Rincon Center, 957-9300. Famous dim sum restaurant. 2009 James Beard Award, San Francisco Chronicle 2009 top 100. Lunch only, Monday–Friday, 11:00 a.m. –3:00 p.m. \$\$-\$\$.
- 50. Zuppa**, SOMA, *Italian/Northern Italian*, 564 4th St., 777-5900. [www.zuppa-sf.com](http://www.zuppa-sf.com). Chef Joseph Mazzares’ chic SOMA hotspot, featuring regional Italian cooking and an all-Italian wine list by Mary Klingbeil. Exceptional affetati, pizzas, pastas and meats. Lunch, Monday–Friday, 11:30 a.m.–2:30 p.m.; dinner nightly, 5:30 p.m.–11:00 p.m. \$.

## Area Map



**2010 Joint Mathematics Meetings Exhibits**  
**January 13 - 16, 2010**  
**Moscone West Convention Center - 1st Floor - Exhibit Hall**  
**San Francisco, CA**



# Exhibitors



## List of Exhibitors (as of 10/26/09)

Join us for the Grand Opening of the  
Joint Mathematics Meetings Exhibits on Wednesday at 12:15 p.m.  
for prizes and giveaways!

**Acme Klein Bottle**  
6270 Colby St.  
Oakland, CA 94618  
**Booth 604**

**ACTEX Publications**  
107 Groppe Drive, Suite A  
PO Box 974  
Winsted, CT 06098  
**Booth 213**

**A K Peters**  
888 Worcester St., Suite 230  
Wellesley, MA 02482  
**Booths 705, 707**

**American Institute of Mathematics**  
360 Portage Ave.  
Palo Alto, CA 94306  
**Booth 712**

**American Mathematics Competitions**  
University of Nebraska  
Lincoln, NE 68503  
**See MAA**

**American Mathematical Society**  
201 Charles St.  
Providence, RI 02904  
**Booths 908, 910, 912, 914, 916,  
918, 911, 913, 915, 917, 919**

**American Statistical Association**  
732 North Washington St.  
Alexandria, VA 22314  
**Booth 505**

**Artifactory Puzzles**  
19810 NE Davis Road  
Brush Prairie, WA 98606-9711  
**Booth 810**

**Art Exhibit Exhibit Hall**

**Association for Women in Mathematics**

11240 Waples Mill Rd., #200  
Fairfax, VA 22030  
**Tabletop**

**Beanactuary.org/Society of Actuaries**

475 N. Martingale Rd., Ste. 600  
Schaumburg, IL 60173-2265  
**Booth 211**

**Birkhauser**

233 Spring St.  
New York, NY 10013  
**Booths 501, 503**

**Brooks/Cole Cengage Learning**  
20 Davis Drive  
Belmont, CA 94002  
**Booths 600, 601, 602, 603**

**Bulatov Abstract Creations**  
2970 Christina St.  
Corvallis, OR 97330  
**Booth 710**

**Budapest Semesters in Mathematics**  
12152 Cabot Avenue  
Dudos, MN 55019  
**Tabletop**

**Cambridge University Press**  
32 Avenue of the Americas  
New York, NY 10013-2473  
**Booths 408, 410, 412**

**Certified Quantitative Finance (CQF)**  
55 Broad St.  
New York, NY 10004  
**Booth 812**

**Dover Publications, Inc.**  
31 East 2nd St.  
Mineola, NY 11501  
**Booth 801**

**Duke University Press/Project Euclid**  
Box 90660  
1121 W Main St.  
Durham, NC 27701-2097  
**Booth 302**



## Exhibitors

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<b>Educational Advancement Foundation</b> 2303 Rio Grande Austin, TX 78705 <b>Booths 511, 513</b>	<b>Jones &amp; Barlett Publishers</b> 40 Tall Pine Dr. Sudbury, MA 01776 <b>Booths 311, 313</b>	<b>Oxford University Press</b> 198 Madison Ave. New York, NY 10016 <b>Booths 700, 702</b>
<b>Elsevier</b> 360 Park Ave. South New York, NY 10010 <b>Booths 304, 306, 308</b>	<b>Mathematical Assn of America</b> 1529 18th St., NW Washington, DC 20036 <b>Booths 922, 924, 926, 928, 930, 932, 925, 927, 929, 931, 933</b>	<b>Pearson</b> 1 Lake St. Conventions Dept Upper Saddle River, NJ 07458 <b>Booths 200, 202, 204, 206</b>
<b>European Mathematical Society Publishing House</b> Seminar for Applied Mathematics ETH-Zentrum FLI C4 Fliederstrasse 23 Zurich, CH-8092 Switzerland <b>Booth 507</b>	<b>MacKichan Software</b> 19307 8th Ave. Suite C Poulsbo, WA 98370 <b>Booth 300</b>	<b>Personal Tex, Inc.</b> 722 Lombard St., Suite 201 San Francisco, CA 94133 <b>Booth 409</b>
<b>The Fusion Project</b> <b>University of San Francisco</b> Dept. of Mathematics San Francisco, CA 94117 <b>Booth 809</b>	<b>Maplesoft</b> 615 Kumpf Drive Waterloo, Ontario N2V 1K8 Canada <b>Booth 400</b>	<b>Pi Mu Epsilon</b> Academic Affairs-Hendrix College 1600 Washington Conway, AR 72032 <b>Booth 608</b>
<b>Green Lion Press</b> 1611 Camino Cruz Bianca Santa Fe, NM 87505-0353 <b>Booth 706</b>	<b>MASS Program</b> 111 McAllister University Park, PA 16802 <b>Booths 611</b>	<b>Princeton University Press</b> 41 William St. Princeton, NJ 08540 <b>Booths 411, 413</b>
<b>Hawkes Learning Systems</b> 1023 Wappoo Road, Suite A6 Charleston, SC 29407 <b>Booths 310, 312</b>	<b>Math for America</b> 800 Third Ave. 31st Floor New York, NY 10022 <b>Booth 207</b>	<b>Project NExT</b> 1529 18th St., NW Washington, DC 20036 See MAA
<b>Institute for Mathematics &amp; Education</b> University of Arizona 617 N. Santa Rita Ave. PO Box 210089 Tucson, AZ 85721-0089 <b>Booth 607</b>	<b>McGraw Hill Higher Education</b> Two Penn Plaza 20th Floor New York, NY 10121-2298 <b>Booths 307, 309</b>	<b>RVJ International, LLC/Happy Feet</b> 6130 W. Flamingo Rd., PMB 460 Las Vegas, NV 89103 <b>Booth 609</b>
<b>IOP Publishing</b> 150 S. Independence Mall W. Philadelphia, PA 19106 <b>Booth 405</b>	<b>Minitab</b> Quality Plaza 1829 Pine Hall Rd. State College, PA 16801 <b>Booths 401, 403</b>	<b>Saltire Software</b> PO Box 230755 Tigard, OR 97281-0755 <b>Booth 708</b>
<b>Jack Lumberman Enterprises</b> PO Box 6252 San Rafael, CA 94903 <b>Booth 711</b>	<b>National Security Agency</b> MB 1 Suite 6779 PO Box 1661 Ft. Meade, MD 20755-6779 <b>Booths 210, 212</b>	<b>SAS Institute Inc, JMP Division</b> JMP Division 100 SAS Campus Dr. Cary, NC 27513 <b>Booth 106</b>
	<b>OEIS Foundation, Inc.</b> 11 South Adelaide Avenue Highland Park, NJ 08904 <b>Booth 813</b>	<b>SIAM</b> 3600 Market St. 6th Floor Philadelphia, PA 19104 <b>Booths 610, 612</b>

## **Exhibitors**

<b>Springer</b> 233 Spring St. New York, NY 10013 <b>Booths 500, 502, 504, 506, 508</b>	Baltimore, MD 21218 <b>Booth 943</b>	<b>Wiley</b> 111 River St. 4-02 Hoboken, NJ 07030-5774 <b>Booths 402, 404, 406</b>
<b>Taylor &amp; Francis Group-CRC Press</b> 6000 Broken Sound Parkway NW Ste. 300 Boca Raton, FL 33487 <b>Booths 301, 303, 305</b>	The New York Times c/o On the Avenue Mktg Group 613 South Ave. Weston, MA 02493 <b>Booth 112</b>	<b>Wolfram Research, Inc</b> 100 Trade Center Drive Champaign, IL 61820 <b>Booths 800, 802</b>
<b>Tessellations</b> 3913 E. Bronco Tr. Phoenix, AZ 85044 <b>Booth 105</b>	University of Tulsa 800 S. Tucker Drive. Helmerich Hall 118-G Tulsa, OK 74104 <b>Booth 709</b>	<b>Wood Mobius</b> 932 Via Verde Monterey, CA 93940 <b>Booth 704</b>
<b>Texas Instruments</b> POB 650311, M/S 3919 Dallas, TX 75265 <b>Booths 701, 703</b>	Walter de Gruyter, Inc 545 8th Ave., Suite 1650 New York, NY 10018 <b>Booth 113</b>	<b>World Scientific Publishing Co.</b> 27 Warren St., Ste. 401-402 Hackensack, NJ 07601 <b>Booth 509</b>
<b>The College Board</b> 45 Columbus Avenue New York, NY 10023 <b>Booth 901</b>	WebAssign 1730 Varsity Drive, Suite 200 Raleigh, NC 27606 <b>Booth 613</b>	<b>Ymir, Inc/ The Ultimate Puzzle</b> PO Box 451421 Los Angeles, CA 90045 <b>Booth 605</b>
<b>The John Hopkins University Press</b> 2715 North Charles St.	W. H. Freeman & Company c/o Bedford, Freeman & Worth 33 Irving Place New York, NY 10003 <b>Booths 510, 512</b>	

Please join us in thanking these long term exhibitors:

Birkhauser - 30 Years  
Cambridge University Press - 30 Years  
Elsevier - 30 Years  
Springer - 30 Years  
W. H. Freeman - 30 Years  
McGraw Hill - 30 Years  
Pearson - 30 Years  
Wiley - 30 years  
Maplesoft - 20 Years  
Society of Actuaries - 20 Years  
Dover Publishing - 15 Years  
Mathtype/Design Science - 15 Years  
Pi Mu Epsilon - 10 Years  
Duke University Press - 5 Years  
European Mathematics Society - 5 Years

for their support of the  
Joint Mathematics Meetings

## Exhibitor Special Event Announcements

### \* **7city Learning , Inc., Booth 812**

**Raffle and Reception:** 7city Learning will have a raffle following an information session on Certificate in Quantitative Finance (CQF) on Friday, 6:00 p.m. to 7:00 p.m. in room Pacific H, Marriott. Three lucky winners will win a copy of the 1st module to the program, each worth US\$3,550. The winners will be chosen at the end of the session. Also join 7city Learning for a light reception. Stop by their booth for details.

### \* **American Mathematical Society, Booth 908-918**

**Raffle:** Stop by the American Mathematical Society booths during the Grand Opening for your chance to enter to win a US\$100.00 AMS Bookstore Gift Certificate. The winner will be announced at 5:00 p.m. that day.

### \* **Birkhäuser, Booth 501**

**Demonstration and Raffle:** Stop by Birkhäuser Booth 501 and browse over 100 print books and over 1,000 ebooks! Also, sign up for 6 weeks free trial access to any of their over 100 journals! Birkhauser will also be having a raffle to win a "Kindle". Stop by their booth to enter. Winner will be announced at the close of Exhibits. Participants need not be present to win.

### \* **Cambridge University Press, Booth 408**

**Raffle:** Cambridge University Press will be raffling off a book of your choice, worth up to US\$85, on Thursday and Friday in their booth..

### \* **Hawkes Learning Systems, Booth 310, 312**

**Reception, Raffles, Demonstration, and Presentation:** Complimentary refreshments will be served on Wednesday at 12:15 p.m. in their booths. They will also be hosting raffles to win free GPS systems. Winners will be chosen on Thursday and Friday, . Winners of GPS systems will also be drawn at the end of each day from all attendees who visit their booths and see a demonstration. Come see a presentation entitled *All Math Software is not Created Equal: What's the Difference?* in Room 2004, Moscone West, on Thursday, 5:30 p.m. to 7:00 p.m.

### \* **Mathematical Association of America, Booth 922-932**

**Treats and Special Opportunity:** Stop by for an ice cream treat on Wednesday. Also stop by Booth #925 at 12:15 p.m. on Wednesday for a chance to be part of MAA History by having an inscribed brick installed in the Paul R. Halmos Commemorative Walk.

**Book Signings:** *Combinatorics: A Guided Tour* by David Mazur on Wednesday at 3:30 p.m.; *Voltaire's Riddle: Micromégas and the Measure of All Things* by Andrew Simoson on Thursday at 4:30 p.m.; *The Moore Method: A Pathway to Learner-Centered Instruction* by W. Ted Mahavier, E. Lee May, and G. Edgar Parker on Friday at 3:00 p.m.



Join us for the  
Grand Opening of the  
Joint Mathematics  
Meetings Exhibits on  
Wednesday at 12:15 p.m.  
for prizes, giveaways, and  
special events!

**\* Princeton University Press, Booth 411**

**Raffles:** Stop by their booth to enter a raffle to win your choice of Princeton University Press titles, valued at US\$200. Also enter daily raffles to win a copy of *Mathematicians: An Outer View of the Inner World* by Mariana Cook with an introduction by R. C. Gunning. Daily drawings will take place at 4:30 p.m. and participants need not be present to win.

**Book Signings:** *Mythematics: Solving the Twelve Labors of Hercules* by Michael Huber on Thursday, 10:00 a.m. to 11:00 a.m.; *Euler's Gem: The Polyhedron Formula and the Birth of Topology* by David S. Richeson on Friday, 10:30 a.m. to 11:30 a.m.; *The Calculus of Friendship: What a Teacher and a Student Learned about Life while Corresponding about Math* by Steven Strogatz on Friday, 2:00 p.m. to 3:00 p.m.

**\* MacKichan Software, Booth 300**

**Raffle:** Win a copy of *Scientific WorkPlace 5.5*, valued at US\$845. Winners will be announced at the close of Exhibits. Participants need not be present to win.

**\* Minitab Inc., Booth 401,403**

**Raffle:** Stop by the Minitab, Inc. booth anytime during exhibit hours to enter to win a software giveaway, name to be determined. Winner will be announced on Saturday at 10:00 a.m. Winner must be present to win.

**\* Springer, Booth 500**

**Demonstration and Raffle:** Stop by Springer Booth 500 and browse over 100 print books and over 1,000 ebooks! Also, sign up for six weeks free trial access to any of their over 100 journals! Springer will also be having a raffle to win a “Kindle”. Stop by their booth to enter. Winner will be announced at the close of Exhibits. Participants need not be present to win.

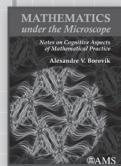
**\* WH Freeman, Booth 510, 512**

**Raffle:** Stop by their booths to enter to win prizes valued at US\$50! Winners will be chosen on Saturday at the close of Exhibits.

**\* USF Fusion Project, Booth 809**

**Raffle:** There will be daily drawings for art posters, Fusion Project “mascots,” and other math and art items. Donations to USF for the Fusion Project will receive recognition and documentation for tax deductibility purposes—and a lot of gratitude.

## NEW RELEASES FROM THE AMS

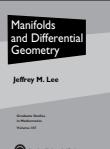


### Mathematics under the Microscope

**Notes on Cognitive Aspects of Mathematical Practice**

Alexandre V. Borovik, *University of Manchester, United Kingdom*

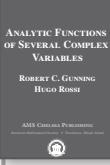
2010; 317 pages; Hardcover; ISBN: 978-0-8218-4761-9; List US\$59; Exhibit Price US\$44; Order code MBK/71



### Manifolds and Differential Geometry

Jeffrey M. Lee, *Texas Tech University, Lubbock, TX*

**Graduate Studies in Mathematics**, Volume 107; 2009; 671 pages; Hardcover; ISBN: 978-0-8218-4815-9; List US\$89; Exhibit Price US\$67; Order code GSM/107



### Analytic Functions of Several Complex Variables

Robert C. Gunning, *Princeton University, NJ*, and Hugo Rossi, *University of Utah, Salt Lake City, UT*

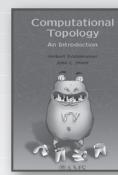
**AMS Chelsea Publishing**, Volume 368; 2009; 317 pages; Hardcover; ISBN: 978-0-8218-2165-7; List US\$50; Exhibit Price US\$43; Order code CHEL/368.H



### Lectures on Fractal Geometry and Dynamical Systems

Yakov Pesin and Vaughn Climenhaga, *Pennsylvania State University, University Park, PA*

**Student Mathematical Library**, Volume 52; 2009; 314 pages; Softcover; ISBN: 978-0-8218-4889-0; List US\$51; Exhibit Price US\$38; Order code STML/52

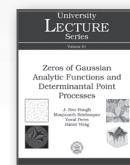


### Computational Topology

#### An Introduction

Herbert Edelsbrunner, *Duke University, Durham, NC*, and John L. Harer, *Duke University, Durham, NC*

2010; 241 pages; Hardcover; ISBN: 978-0-8218-4925-5; List US\$59; Exhibit Price US\$44; Order code MBK/69



### Zeros of Gaussian Analytic Functions and Determinantal Point Processes

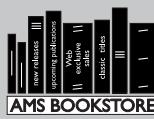
J. Ben Hough, *HBK Capital Management, New York, NY*, Manjunath Krishnapur, *Indian Institute of Science, Bangalore, India*, Yuval Peres, *Microsoft Research, Redmond, WA*, and Bálint Virág, *University of Toronto, ON, Canada*

**University Lecture Series**, Volume 51; 2009; 154 pages; Softcover; ISBN: 978-0-8218-4373-4; List US\$39; Exhibit Price US\$29; Order code ULECT/51

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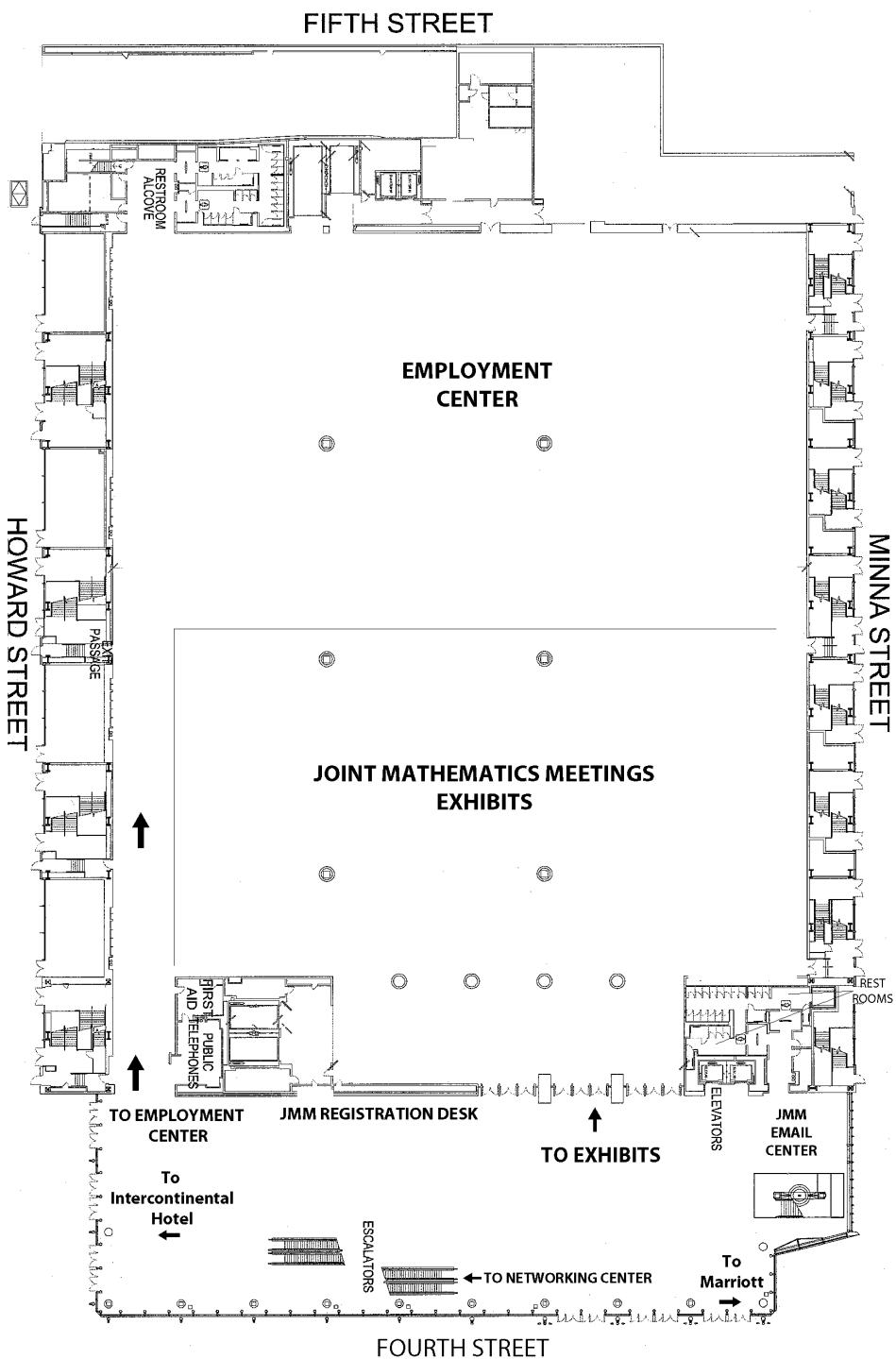
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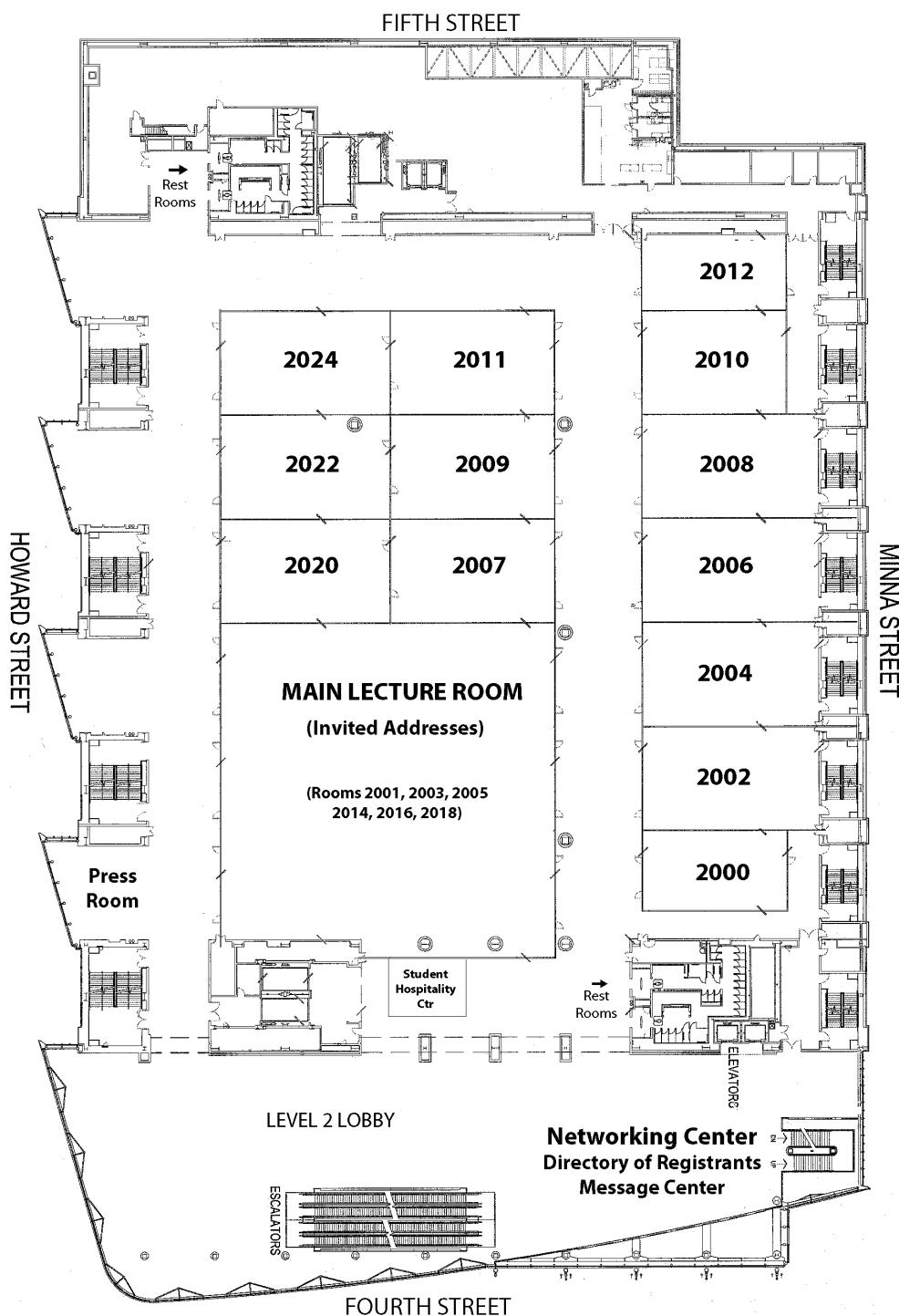
# Floor Plans

## Moscone West Level 1

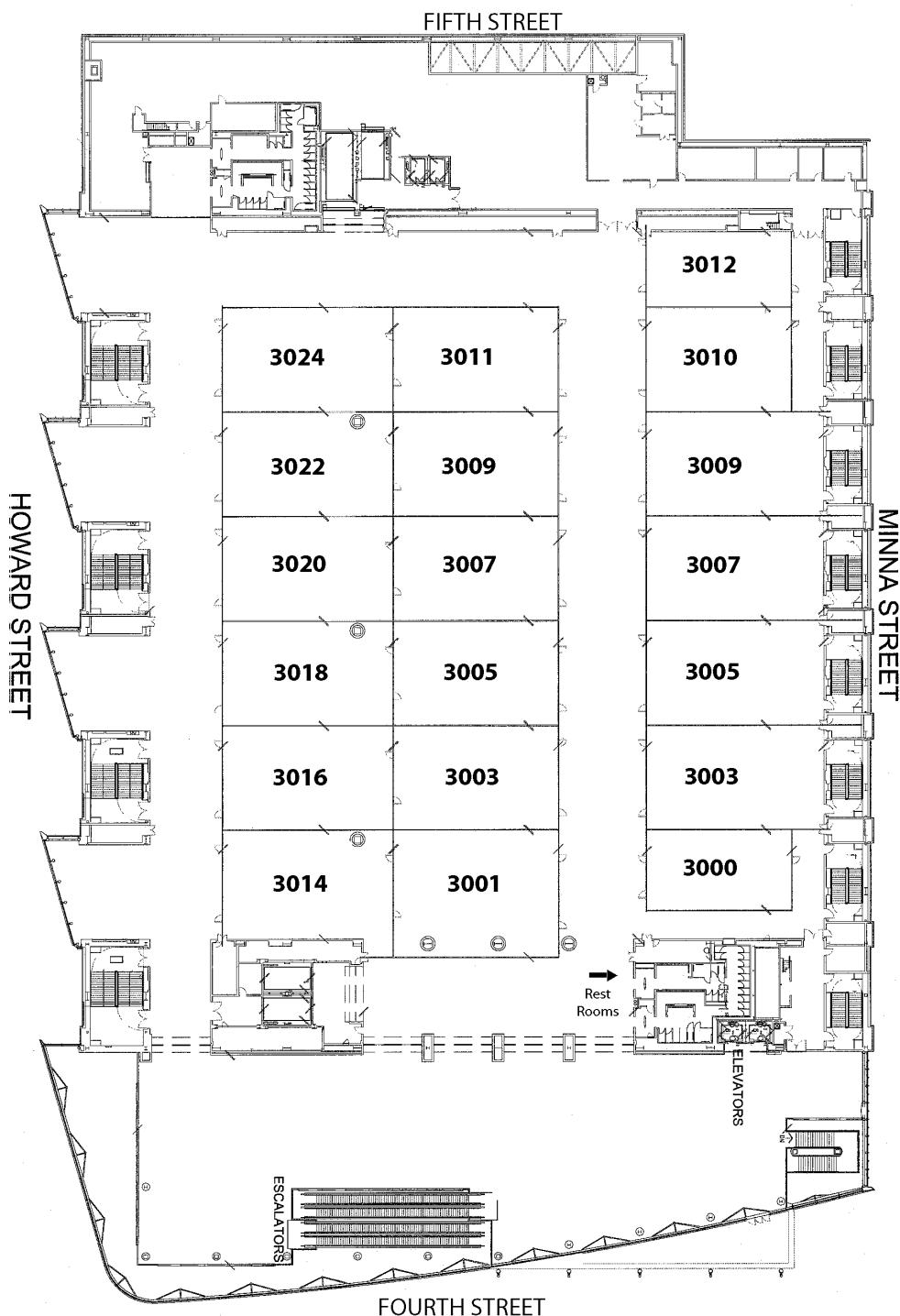


THE MATHEMATICAL  
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**Moscone West**  
**Level 2**

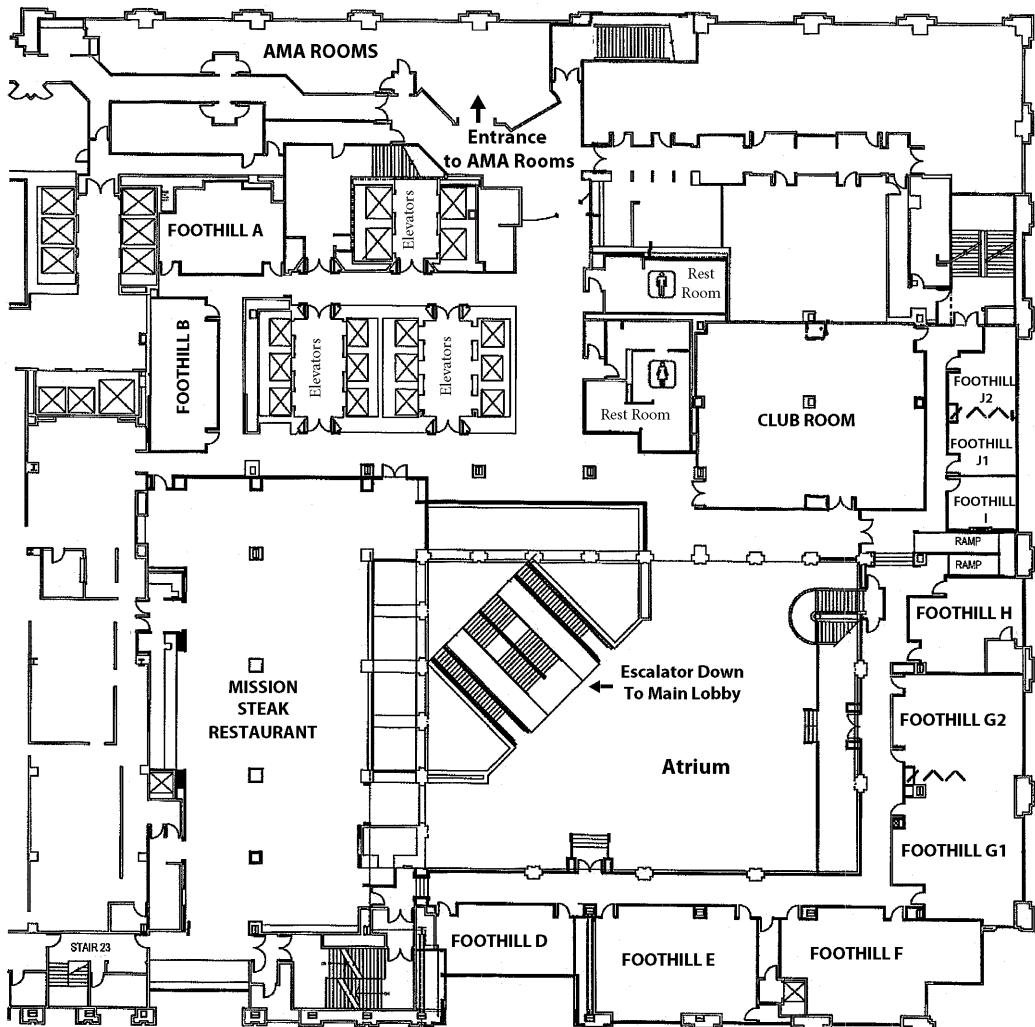
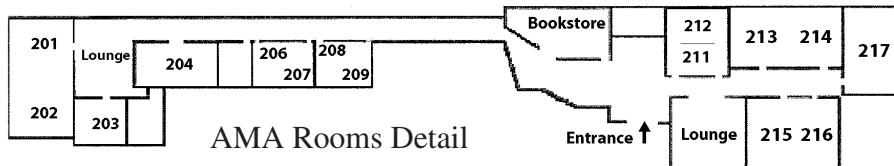


**Moscone West**  
**Level 3**

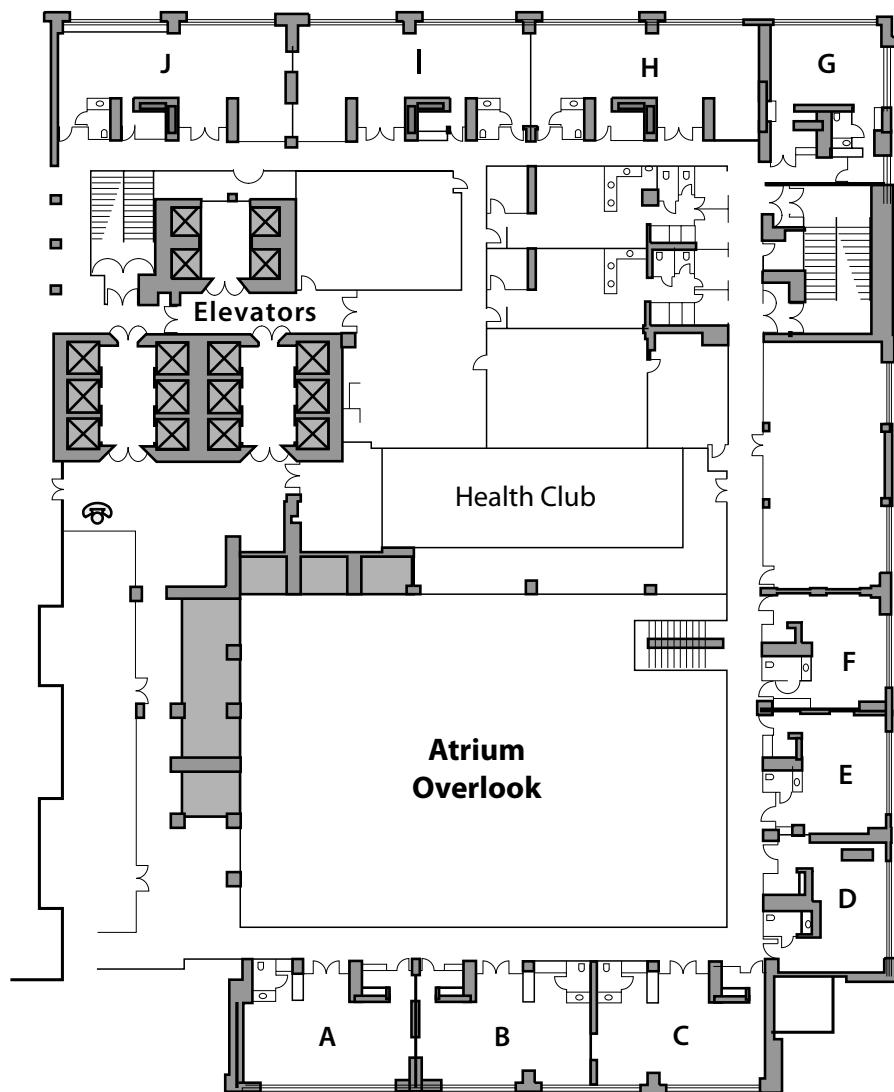


Floor Plans

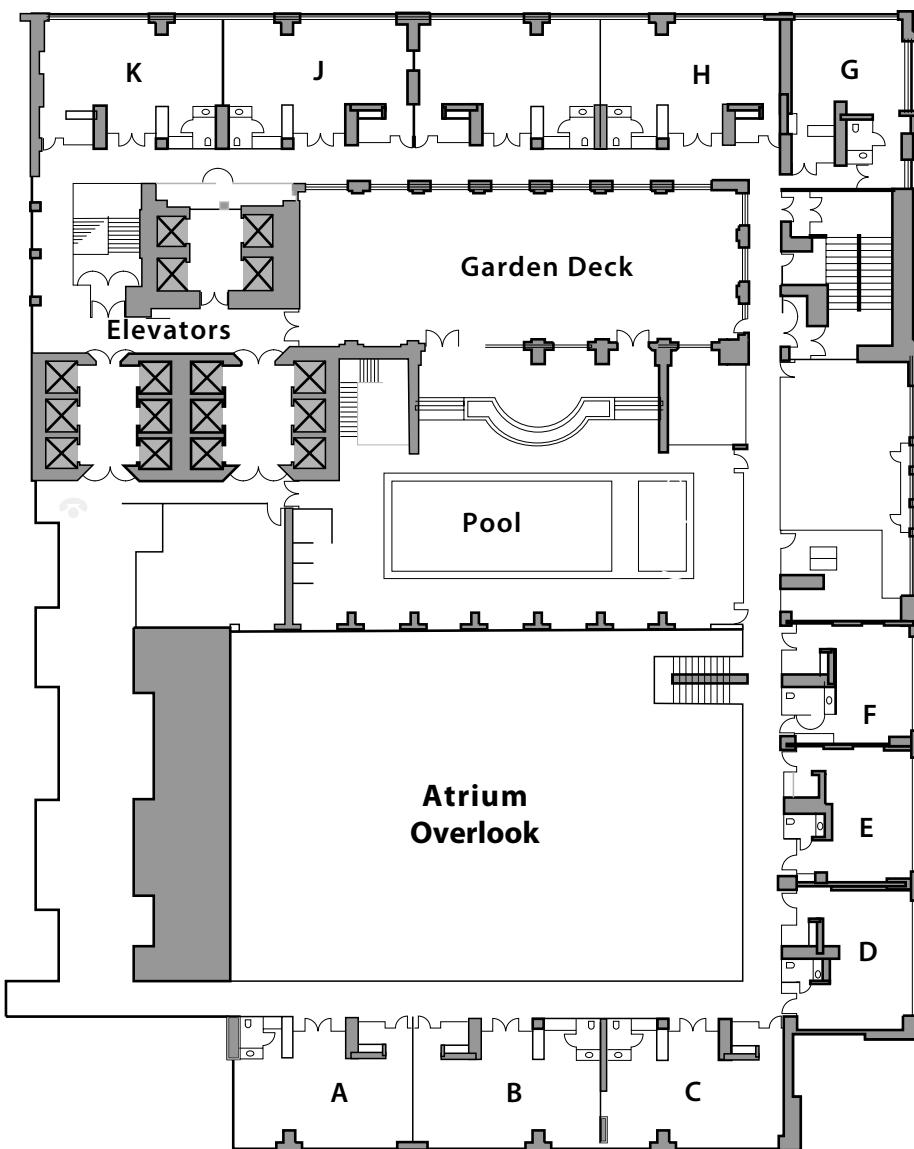
**San Francisco Marriott**  
**Atrium Level, 2nd Floor**  
**Foothill Rooms and AMA Rooms**



**San Francisco Marriott  
Pacific Rooms, 4th Floor**



**San Francisco Marriott  
Sierra Rooms, 5th Floor**



# Program at a Glance



## Program at a Glance

This document provides a thumbnail sketch of all scientific and social events so you can easily see which events may overlap and better plan your time.

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### Monday, January 11

- 9:00 a.m.-4:30 p.m. **MAA SHORT COURSE ON EXPLORING THE GREAT BOOKS OF MATHEMATICS, PART I**, Room 2002, 2nd Floor, Moscone
- 9:00 a.m.-4:30 p.m. **AMS TUTORIAL ON MODELING, PART I: INTRODUCTION TO NUMERICAL MODELING**, Room 2006, 2nd Floor, Moscone
- 9:30 a.m.-5:00 p.m. **AMS SHORT COURSE ON MARKOV CHAINS AND MIXING TIMES, PART I**, Room 2004, 2nd Floor, Moscone

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### Tuesday, January 12

- 8:00 a.m.-6:00 p.m. **AMS DEPARTMENT CHAIRS WORKSHOP**, Room 2007, 2nd Floor, Moscone
- 8:30 a.m.-5:00 p.m. **MAA ANCILLARY WORKSHOP ON STATISTICS: TEACHING INTRODUCTORY STATISTICS**, Pacific I, Marriott San Francisco
- 8:30 a.m.-5:00 p.m. **MAA ANCILLARY WORKSHOP ON STATISTICS: BECOME A CATALYST FOR CHANGE IN STATISTICS EDUCATION**, Pacific J, Marriott San Francisco
- 9:00 a.m.-4:30 p.m. **AMS SHORT COURSE ON MARKOV CHAINS AND MIXING TIMES, PART II**, Room 2004, 2nd Floor, Moscone
- 9:00 a.m.-5:00 p.m. **MAA SHORT COURSE ON EXPLORING THE GREAT BOOKS OF MATHEMATICS, PART II**, Room 2002, 2nd Floor, Moscone
- 9:00 a.m.-4:30 p.m. **AMS TUTORIAL ON MODELING, PART II: INTRODUCTION TO STATISTICAL MODELING**, Room 2006, 2nd Floor, Moscone
- 9:00 a.m.-5:00 p.m. **MAA BOARD OF GOVERNORS**, Room 3014, 3rd Floor, Moscone
- 1:30 p.m.-10:00 p.m. **AMS COUNCIL**, Room 3016, 3rd Floor, Moscone
- 3:00 p.m.-7:00 p.m. **JOINT MEETINGS REGISTRATION**, First Floor Lobby, Moscone
- 7:00 p.m.-9:00 p.m. **MAA NEW COMMITTEE CHAIRS WORKSHOP**, Pacific H, Marriott San Francisco



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## Wednesday, January 13

7:30 a.m.–6:00 p.m.	<b>JOINT MEETINGS REGISTRATION</b> , First Floor Lobby, Moscone
	<b>AMS SPECIAL SESSIONS</b>
8:00 a.m.–10:50 a.m.	<i>Mathematics of Computation, I (AMS-SIAM)</i> , Room 2004, 2nd Floor, Moscone
8:00 a.m.–10:40 a.m.	<i>Surreal Numbers, I (AMS-ASL)</i> , Room 3011, 3rd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Degenerate and Singular Elliptic Partial Differential Equations, I</i> , Room 3016, 3rd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Difference Equations and Applications, I</i> , Room 3003, 3rd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Harmonic Analysis (Mathematics Research Communities session), I</i> , Room 2006, 2nd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Inverse Problems: Analysis and Computations (Mathematics Research Communities session), I</i> , Room 2008, 2nd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>the Mathematical Challenges of Relativity (Mathematics Research Communities session), I</i> , Room 2000, 2nd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Algebraic Aspects of Cryptology, I</i> , Room 3009, 3rd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Markov Chains and Their Statistical Applications (Mathematics Research Communities session), I</i> , Room 2010, 2nd Floor, Moscone
8:00 a.m.–10:40 a.m.	<i>Zonotopal Algebra and Its Applications, I</i> , Room 3005, 3rd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Applications of Graph Theory, I</i> , Room 3007, 3rd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Arithmetic and Nonarchimedean Dynamics, I</i> , Room 2012, 2nd Floor, Moscone
	<b>AMS CONTRIBUTED PAPER SESSIONS</b>
8:00 a.m.–10:55 a.m.	<i>Group Theory, I</i> , Room 3020, 3rd Floor, Moscone
8:00 a.m.–10:40 a.m.	<i>Probability and Statistics, I</i> , Room 3010, 3rd Floor, Moscone
8:00 a.m.–9:40 a.m.	<i>Mathematics in the Social Sciences</i> , Room 2007, 2nd Floor, Moscone
8:00 a.m.–9:55 a.m.	<i>Complex Analysis</i> , Room 3022, 3rd Floor, Moscone
8:00 a.m.–10:10 a.m.	<i>Geometry and Topology, I</i> , Room 3012, 3rd Floor, Moscone
8:00 a.m.–10:55 a.m.	<i>Discrete Mathematics, I</i> , Room 3018, 3rd Floor, Moscone
	<b>MAA CONTRIBUTED PAPER SESSIONS</b>
8:00 a.m.–10:55 a.m.	<i>General Contributed Papers, I</i> , Room 3000, 3rd Floor, Moscone
8:00 a.m.–10:55 a.m.	<i>The Scholarship of Teaching and Learning in Undergraduate Mathematics, I</i> , Room 2011, 2nd Floor, Moscone
8:00 a.m.–10:55 a.m.	<i>Improving a Second Course in Statistics</i> , Room 2009, 2nd Floor, Moscone
8:00 a.m.–7:00 p.m.	<b>EMPLOYMENT CENTER</b> , Exhibit Hall, Moscone
8:05 a.m.–11:00 a.m.	<b>SIAM MINISYMPOSIUM ON ECONOMICS AND SUSTAINABILITY</b> , Room 2002, 2nd Floor, Moscone
	<b>MAA CONTRIBUTED PAPER SESSIONS</b>
8:55 a.m.–10:55 a.m.	<i>Mathematical Texts: Famous, Infamous, and Influential, I</i> , Room 2022, 2nd Floor, Moscone
9:00 a.m.–11:00 a.m.	<b>MAA MINICOURSE #13: PART A</b> <i>Taking symbols seriously: Teaching form and function in college algebra.</i> , Pacific J, Marriott San Francisco
9:00 a.m.–11:00 a.m.	<b>MAA MINICOURSE #4: PART A</b> <i>Using video-case studies in teaching a proof-based gateway course to the mathematics major.</i> , Pacific H, Marriott San Francisco
9:00 a.m.–11:00 a.m.	<b>MAA MINICOURSE #7: PART A</b> <i>Teaching with clickers in the classroom.</i> , Pacific I, Marriott San Francisco
	<b>MAA CONTRIBUTED PAPER SESSIONS</b>
9:00 a.m.–10:35 a.m.	<i>My Most Successful Math Club Activity</i> , Room 2020, 2nd Floor, Moscone

9:00 a.m.–5:00 p.m.	<b>STUDENT HOSPITALITY CENTER</b> , South Lobby, 2nd Floor, Moscone
9:00 a.m.–10:20 a.m.	<b>MAA CUPM SUBCOMMITTEE ON MATHEMATICS ACROSS THE DISCIPLINES PANEL DISCUSSION</b> <i>Mathematical collaborations with other disciplines: Research partnerships and interdisciplinary programs.</i> , Room 3004, 3rd Floor, Moscone
9:00 a.m.–10:20 a.m.	<b>MAA PANEL DISCUSSION</b> <i>National Science Foundations programs supporting learning and teaching in the mathematical sciences.</i> , Room 3006, 3rd Floor, Moscone
9:30 a.m.–11:00 a.m.	<b>MAA DEPARTMENT LIAISONS MEETING</b> , Room 3014, 3rd Floor, Moscone
10:00 a.m.–10:55 a.m.	<b>AMS CONTRIBUTED PAPER SESSIONS</b> <i>Category Theory</i> , Room 2007, 2nd Floor, Moscone
10:05 a.m.–10:55 a.m.	<b>AMS INVITED ADDRESS</b> <i>Chaos and symmetry in partially hyperbolic systems.</i> Amie Wilkinson, Main Lecture Room, 2nd Floor, Moscone
10:15 a.m.–10:55 a.m.	<b>AMS CONTRIBUTED PAPER SESSIONS</b> <i>Matrices and Tensors</i> , Room 3022, 3rd Floor, Moscone
11:10 a.m.–12:00 p.m.	<b>AMS-MAA INVITED ADDRESS</b> <i>The interpolation problem.</i> Joseph Harris, Main Lecture Room, 2nd Floor, Moscone
12:15 p.m.–5:30 p.m.	<b>EXHIBITS AND BOOK SALES</b> <i>Come to the Grand Opening at 12:15!</i> , Exhibit Hall, Moscone
1:00 p.m.–2:00 p.m.	<b>AMS COLLOQUIUM LECTURES: LECTURE I</b> <i>Increasing and decreasing subsequences.</i> Richard P. Stanley, Main Lecture Room, 2nd Floor, Moscone
2:15 p.m.–3:05 p.m.	<b>MAA INVITED ADDRESS</b> <i>The real computation controversy: Is it real?</i> Lenore Blum, Main Lecture Room, 2nd Floor, Moscone
2:15 p.m.–6:05 p.m.	<b>AMS SPECIAL SESSIONS</b> <i>Mathematics of Computation, II (AMS-SIAM)</i> , Room 2004, 2nd Floor, Moscone
2:15 p.m.–6:05 p.m.	<i>Surreal Numbers, II (AMS-ASL)</i> , Room 3011, 3rd Floor, Moscone
2:15 p.m.–6:05 p.m.	<i>Difference Equations and Applications, II</i> , Room 3003, 3rd Floor, Moscone
2:15 p.m.–6:05 p.m.	<i>Geometric Aspects of Link and 3-manifold Invariants, I</i> , Room 3016, 3rd Floor, Moscone
2:15 p.m.–5:05 p.m.	<i>Harmonic Analysis (Mathematics Research Communities session), II</i> , Room 2006, 2nd Floor, Moscone
2:15 p.m.–5:35 p.m.	<i>Inverse Problems: Analysis and Computations (Mathematics Research Communities session), II</i> , Room 2008, 2nd Floor, Moscone
2:15 p.m.–5:05 p.m.	<i>the Mathematical Challenges of Relativity (Mathematics Research Communities session), II</i> , Room 2000, 2nd Floor, Moscone
2:15 p.m.–5:35 p.m.	<i>Algebraic Aspects of Cryptology, II</i> , Room 3009, 3rd Floor, Moscone
2:15 p.m.–4:55 p.m.	<i>Markov Chains and Their Statistical Applications (Mathematics Research Communities session), II</i> , Room 2010, 2nd Floor, Moscone
2:15 p.m.–5:55 p.m.	<i>Zonotopal Algebra and Its Applications, II</i> , Room 3005, 3rd Floor, Moscone
2:15 p.m.–6:05 p.m.	<i>Applications of Graph Theory, II</i> , Room 3007, 3rd Floor, Moscone
2:15 p.m.–6:05 p.m.	<i>Arithmetic and Nonarchimedean Dynamics, II</i> , Room 2012, 2nd Floor, Moscone
2:15 p.m.–5:35 p.m.	<b>MAA INVITED PAPER SESSIONS</b> <i>Online Delivery of Mathematics</i> , Room 3008, 3rd Floor, Moscone
2:15 p.m.–4:15 p.m.	<b>MAA MINICOURSE #11: PART A</b> <i>The mathematics of Islam and its use in the teaching of mathematics.</i> , Pacific I, Marriott San Francisco
2:15 p.m.–4:15 p.m.	<b>MAA MINICOURSE #12: PART A</b> <i>Learning discrete mathematics via historical projects.</i> , Pacific J, Marriott San Francisco

## Program at a Glance – Wednesday, January 13

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2:15 p.m.–4:15 p.m.	<b>MAA MINICOURSE #6: PART A</b> <i>Developing departmental self-studies.,</i> Pacific H, Marriott San Francisco
	<b>AMS CONTRIBUTED PAPER SESSIONS</b> <i>Group Theory, II,</i> Room 3020, 3rd Floor, Moscone
2:15 p.m.–5:55 p.m.	<i>Probability and Statistics, II,</i> Room 3010, 3rd Floor, Moscone
2:15 p.m.–5:55 p.m.	<i>Geometry and Topology, II,</i> Room 3012, 3rd Floor, Moscone
2:15 p.m.–5:40 p.m.	<i>Discrete Mathematics, II,</i> Room 3018, 3rd Floor, Moscone
	<b>MAA CONTRIBUTED PAPER SESSIONS</b> <i>General Contributed Papers, II,</i> Room 3000, 3rd Floor, Moscone
2:15 p.m.–5:55 p.m.	<i>Developmental Mathematics Education: Helping Under-Prepared Students Transition to College-Level Mathematics, I,</i> Room 2024, 2nd Floor, Moscone
2:15 p.m.–5:50 p.m.	<i>Experiences that Enrich the Education of Mathematics Majors, I,</i> Room 2020, 2nd Floor, Moscone
2:15 p.m.–6:10 p.m.	<i>Preparing K–12 Teachers to Teach Algebra, I,</i> Room 2009, 2nd Floor, Moscone
2:15 p.m.–5:10 p.m.	<i>The Scholarship of Teaching and Learning in Undergraduate Mathematics, II,</i> Room 2011, 2nd Floor, Moscone
2:15 p.m.–6:30 p.m.	<i>The MAA SUMMA Program Turns 20—A Retrospective,</i> Room 3002, 3rd Floor, Moscone
2:15 p.m.–4:30 p.m.	<i>Mathematical Texts: Famous, Infamous, and Influential, II,</i> Room 2022, 2nd Floor, Moscone
2:15 p.m.–6:30 p.m.	<b>SIAM MINISYMPOSIUM ON FRONTIERS IN GEOMATHEMATICS,</b> Room 2002, 2nd Floor, Moscone
2:15 p.m.–4:15 p.m.	<b>MAA-YOUNG MATHEMATICIANS' NETWORK POSTER SESSION,</b> Room 3001, 3rd Floor, Moscone
2:15 p.m.–3:25 p.m.	<b>MAA PANEL DISCUSSION</b> <i>Cultivating mathematical interest and talent of precollege students: Outreach through summer math camps and academies.,</i> Room 3004, 3rd Floor, Moscone
2:15 p.m.–3:40 p.m.	<b>AWM PANEL DISCUSSION</b> <i>Dual careers or dueling careers? Jobs and the two-body problem.,</i> Room 2007, 2nd Floor, Moscone
	<b>MAA CONTRIBUTED PAPER SESSIONS</b> <i>General Contributed Papers, III,</i> Room 3006, 3rd Floor, Moscone
2:30 p.m.–4:25 p.m.	<b>MAA SECTION OFFICERS,</b> Room 3014, 3rd Floor, Moscone
2:30 p.m.–5:00 p.m.	<b>MAA INVITED ADDRESS</b> <i>The factorial function, integer-valued polynomials, and p-adic calculus.</i> <b>Manjul Bhargava</b> , Main Lecture Room, 2nd Floor, Moscone
3:20 p.m.–4:10 p.m.	<b>AWM BUSINESS MEETING,</b> Room 2007, 2nd Floor, Moscone
3:45 p.m.–4:15 p.m.	<b>MAA COMMITTEE ON GRADUATE STUDENTS-YOUNG</b>
3:50 p.m.–5:10 p.m.	<b>MATHEMATICIANS' NETWORK PANEL DISCUSSION</b> <i>How to interview for a job in the mathematical sciences.,</i> Room 3004, 3rd Floor, Moscone
4:00 p.m.–5:00 p.m.	<b>RECEPTION FOR UNDERGRADUATE STUDENTS,</b> South Lobby, 2nd Floor, Moscone
	<b>MAA CONTRIBUTED PAPER SESSIONS</b> <i>General Contributed Papers, IV,</i> Room 2024, 2nd Floor, Moscone
4:30 p.m.–5:40 p.m.	<b>AMS-MAA SPECIAL PRESENTATION,</b> <i>Elementary school teachers as mathematicians: As the twig is bent the tree grows.,</i> Room 2007, 2nd Floor, Moscone
4:30 p.m.–6:00 p.m.	<b>SIGMAA ON THE HISTORY OF MATHEMATICS BUSINESS MEETING, RECEPTION, AND GUEST LECTURE,</b> Room 3006, 3rd Floor, Moscone
5:30 p.m.–7:30 p.m.	

5:30 p.m.–6:30 p.m.	<b>SIGMAA ON MATH CIRCLES FOR STUDENTS AND TEACHERS BUSINESS MEETING</b> , Room 3004, 3rd Floor, Moscone
5:30 p.m.–6:30 p.m.	<b>RECEPTION FOR GRADUATE STUDENTS AND FIRST-TIME PARTICIPANTS</b> , Atrium, Marriott San Francisco
5:30 p.m.–8:00 p.m.	<b>MATHEMATICAL INSTITUTES OPEN HOUSE</b> , Room 3022, 3rd Floor, Moscone
8:30 p.m.–9:30 p.m.	<b>AMS JOSIAH WILLARD GIBBS LECTURE</b> <i>Quantum channels and their capacities.</i> Peter W. Shor, Main Lecture Room, 2nd Floor, Moscone
9:30 p.m.–11:00 p.m.	<b>AWM RECEPTION</b> , Atrium, Marriott San Francisco

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## Thursday, January 14

7:30 a.m.–4:00 p.m.	<b>JOINT MEETINGS REGISTRATION</b> , First Floor Lobby, Moscone
<b>AMS SPECIAL SESSIONS</b>	
8:00 a.m.–11:50 a.m.	<i>Arithmetic of Function Fields, I</i> , Room 3009, 3rd Floor, Moscone
8:00 a.m.–11:50 a.m.	<i>Commutative Algebra, I</i> , Room 3011, 3rd Floor, Moscone
8:00 a.m.–11:50 a.m.	<i>Geometric Aspects of Link and 3-manifold Invariants, II</i> , Room 3016, 3rd Floor, Moscone
8:00 a.m.–11:50 a.m.	<i>Graph Algebras in Analysis and Algebra, I</i> , Room 3007, 3rd Floor, Moscone
8:00 a.m.–11:40 a.m.	<i>Interactions of Inverse Problems, Signal Processing, and Imaging, I</i> , Room 2000, 2nd Floor, Moscone
8:00 a.m.–11:50 a.m.	<i>Algebraic Methods in Signal Processing, I</i> , Room 2008, 2nd Floor, Moscone
8:00 a.m.–11:40 a.m.	<i>The Mathematics of Information and Knowledge, I</i> , Room 2012, 2nd Floor, Moscone
8:00 a.m.–11:50 a.m.	<i>Voting Theory, I</i> , Room 2010, 2nd Floor, Moscone
8:00 a.m.–11:50 a.m.	<i>Analysis and Control Under Uncertainty, I</i> , Room 2006, 2nd Floor, Moscone
8:00 a.m.–11:50 a.m.	<i>Applications of Time Scales to Biology, Economics, and Engineering, I</i> , Room 2004, 2nd Floor, Moscone
8:00 a.m.–11:50 a.m.	<i>Arithmetic Geometry, I</i> , Room 3005, 3rd Floor, Moscone
<b>MAA INVITED PAPER SESSIONS</b>	
8:00 a.m.–9:50 a.m.	<i>Environmental Modeling</i> , Room 3002, 3rd Floor, Moscone
8:00 a.m.–10:00 a.m.	<b>MAA MINICOURSE #3: PART A</b> <i>Educating about the state of the planet and sustainability while enhancing calculus.</i> , Pacific H, Marriott San Francisco
8:00 a.m.–10:00 a.m.	<b>MAA MINICOURSE #8: PART A</b> <i>The Fibonacci and Catalan numbers.</i> , Pacific I, Marriott San Francisco
<b>AMS CONTRIBUTED PAPER SESSIONS</b>	
8:00 a.m.–11:55 a.m.	<i>Biomathematics, I</i> , Room 3012, 3rd Floor, Moscone
8:00 a.m.–11:55 a.m.	<i>Differential and Difference Equations, I</i> , Room 3018, 3rd Floor, Moscone
8:00 a.m.–9:40 a.m.	<i>Geometry and Topology, III</i> , Room 3010, 3rd Floor, Moscone
8:00 a.m.–11:55 a.m.	<i>Number Theory, I</i> , Room 2007, 2nd Floor, Moscone
<b>MAA CONTRIBUTED PAPER SESSIONS</b>	
8:00 a.m.–11:55 a.m.	<i>Mathematics Experiences in Business, Industry, and Government</i> , Room 2011, 2nd Floor, Moscone
8:00 a.m.–11:55 a.m.	<i>General Contributed Papers, V</i> , Room 3000, 3rd Floor, Moscone
8:00 a.m.–11:55 a.m.	<i>Mathematics, Equity, Diversity, and Social Justice, I</i> , Room 2022, 2nd Floor, Moscone

## **Program at a Glance – Thursday, January 14**

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- 8:00 a.m.–9:15 a.m. *Experiences that Enrich the Education of Mathematics Majors, II*, Room 3008, 3rd Floor, Moscone
- 8:00 a.m.–11:35 a.m. *Mathematics Courses for the Liberal Arts Students, I*, Room 2024, 2nd Floor, Moscone
- 8:00 a.m.–10:35 a.m. *Using Computer Algebra Systems in the Calculus Sequence*, Room 2020, 2nd Floor, Moscone
- 8:00 a.m.–11:55 a.m. *Engaging Students with Classroom Voting*, Room 2009, 2nd Floor, Moscone
- 8:00 a.m.–10:55 a.m. **SIAM MINISYMPOSIUM ON HIGH SCHOOL OUTREACH TO INTRODUCE STUDENTS TO APPLIED MATHEMATICS**, Room 2002, 2nd Floor, Moscone
- 8:00 a.m.–9:15 a.m. **MAA-PROJECT NEXT PANEL DISCUSSION** *Teaching calculus to students who have had AP calc: Challenges and solutions.*, Room 3024, 3rd Floor, Moscone
- 8:00 a.m.–7:00 p.m. **EMPLOYMENT CENTER**, Exhibit Hall, Moscone
- 9:00 a.m.–9:50 a.m. **MAA INVITED ADDRESS** *Reasonable effectiveness: Trigonometry, ancient astronomy, and the birth of applied mathematics.* **Glen Van Brummelen**, Main Lecture Room, 2nd Floor, Moscone
- 9:00 a.m.–11:00 a.m. **MAA MINICOURSE #10: PART A** *The hitchhiker's guide to mathematics.*, Pacific J, Marriott San Francisco
- 9:00 a.m.–5:00 p.m. **STUDENT HOSPITALITY CENTER**, South Lobby, 2nd Floor, Moscone
- 9:00 a.m.–10:20 a.m. **MAA COMMITTEE ON TECHNOLOGY IN MATHEMATICS EDUCATION PANEL DISCUSSION** *Online articles from JOMA to Loci.*, Room 3006, 3rd Floor, Moscone
- 9:00 a.m.–10:20 a.m. **MAA SESSION FOR DEPARTMENT CHAIRS** *Assessment of student learning outcomes: Opportunity and challenge.*, Room 3004, 3rd Floor, Moscone
- 9:00 a.m.–11:00 a.m. **MAA COMMITTEE ON THE PARTICIPATION OF WOMEN/WOMEN IN MATHEMATICS NETWORK POSTER SESSION** *Mathematical outreach programs for underrepresented populations.*, Room 3001, 3rd Floor, Moscone
- 9:30 a.m.–11:00 a.m. **AMS SPECIAL PRESENTATION** *Who wants to be a mathematician—national contest.*, Room 3020, 3rd Floor, Moscone
- 9:30 a.m.–10:50 a.m. **MAA-PROJECT NEXT PANEL DISCUSSION** *How one can become a referee/reviewer.*, Room 3024, 3rd Floor, Moscone
- 9:30 a.m.–5:30 p.m. **EXHIBITS AND BOOK SALES**, Exhibit Hall, Moscone
- 10:00 a.m.–11:55 a.m. **MAA INVITED PAPER SESSIONS**  
*Gems of Number Theory*, Room 3008, 3rd Floor, Moscone
- 10:00 a.m.–11:55 p.m. **AMS CONTRIBUTED PAPER SESSIONS**  
*Probability and Statistics, III*, Room 3010, 3rd Floor, Moscone
- 10:00 a.m.–12:00 p.m. **AMS-ASL-MAA PANEL DISCUSSION** *Hilbert's Tenth Problem.*, Room 3003, 3rd Floor, Moscone
- 10:05 a.m.–10:55 a.m. **AWM EMMY NOETHER LECTURE** *You can't hear the shape of a manifold.* **Carolyn S. Gordon**, Main Lecture Room, 2nd Floor, Moscone
- 10:30 a.m.–12:30 p.m. **MAA MINICOURSE #1: PART A** *Remodeling data analysis.*, Pacific H, Marriott San Francisco
- 10:30 a.m.–12:30 p.m. **MAA MINICOURSE #5: PART A** *Active learning approaches for the foundational mathematics for elementary teachers courses.*, Pacific I, Marriott San Francisco
- 10:30 a.m.–12:00 p.m. **SIGMAA OFFICERS MEETING**, Room 3014, 3rd Floor, Moscone
- 10:40 a.m.–12:00 p.m. **MAA-YMN PANEL DISCUSSION** *Graduate school: Choosing one, getting in, staying in.*, Room 3006, 3rd Floor, Moscone

10:40 a.m.–12:00 p.m. **MAA WORKSHOP** *Proposal writing workshop for grant applications to the NSF Division of Undergraduate Education.*, Room 3004, 3rd Floor, Moscone

11:10 a.m.–12:00 p.m. **SIAM INVITED ADDRESS** *Optimization Inside: The use of mathematical methods in business processes.* **Brenda Dietrich**, Main Lecture Room, 2nd Floor, Moscone

1:00 p.m.–2:00 p.m. **AMS COLLOQUIUM LECTURES: LECTURE II** *Alternating permutations.* **Richard P. Stanley**, Main Lecture Room, 2nd Floor, Moscone

#### **AMS SPECIAL SESSIONS**

1:00 p.m.–3:50 p.m. *Nonlinear Hyperbolic Equations and Control Systems in Physics and Engineering, I*, Room 2000, 2nd Floor, Moscone

1:00 p.m.–3:50 p.m. *Degenerate and Singular Elliptic Partial Differential Equations, II*, Room 3016, 3rd Floor, Moscone

1:00 p.m.–3:50 p.m. *Graph Algebras in Analysis and Algebra, II*, Room 3007, 3rd Floor, Moscone

1:00 p.m.–3:40 p.m. *Algebraic Methods in Signal Processing, II*, Room 2008, 2nd Floor, Moscone

1:00 p.m.–4:20 p.m. *Representation Theory and Nonassociative Algebras, I*, Room 3011, 3rd Floor, Moscone

1:00 p.m.–3:50 p.m. *Use of Technology in Modern Complex Analysis Research, I*, Room 2012, 2nd Floor, Moscone

1:00 p.m.–3:50 p.m. *Voting Theory, II*, Room 2010, 2nd Floor, Moscone

1:00 p.m.–3:20 p.m. *Analysis and Control Under Uncertainty, II*, Room 2006, 2nd Floor, Moscone

1:00 p.m.–4:20 p.m. *Applications of Time Scales to Biology, Economics, and Engineering, II*, Room 2004, 2nd Floor, Moscone

1:00 p.m.–3:50 p.m. *Arithmetic Geometry, II*, Room 3005, 3rd Floor, Moscone

#### **MAA INVITED PAPER SESSIONS**

1:00 p.m.–3:50 p.m. *Mathematics and Education Reform, I: Guided Discovery Learning (MAA-AMS-MER)*, Room 3008, 3rd Floor, Moscone

1:00 p.m.–3:00 p.m. **MAA MINICOURSE #2: PART A** *Using GeoGebra to create activities and applets for visualization and exploration.*, Pacific H, Marriott San Francisco

1:00 p.m.–3:00 p.m. **MAA MINICOURSE #9: PART A** *Getting students involved in undergraduate research.*, Pacific I, Marriott San Francisco

#### **AMS CONTRIBUTED PAPER SESSIONS**

1:00 p.m.–3:55 p.m. *Number Theory, II*, Room 2007, 2nd Floor, Moscone

1:00 p.m.–4:10 p.m. *Biomathematics, II*, Room 3012, 3rd Floor, Moscone

1:00 p.m.–4:10 p.m. *Differential and Difference Equations, II*, Room 3018, 3rd Floor, Moscone

1:00 p.m.–4:10 p.m. *Computational Mathematics, I*, Room 3010, 3rd Floor, Moscone

1:00 p.m.–4:10 p.m. *Fields and Commutative Algebra*, Room 3022, 3rd Floor, Moscone

1:00 p.m.–3:55 p.m. *Discrete Mathematics, III*, Room 3020, 3rd Floor, Moscone

#### **MAA CONTRIBUTED PAPER SESSIONS**

1:00 p.m.–4:15 p.m. *Developmental Mathematics Education: Helping Under-Prepared Students Transition to College-Level Mathematics, II*, Room 2020, 2nd Floor, Moscone

1:00 p.m.–4:10 p.m. *General Contributed Papers, VI*, Room 3000, 3rd Floor, Moscone

1:00 p.m.–3:55 p.m. *Mathematics Courses for the Liberal Arts Students, II*, Room 2024, 2nd Floor, Moscone

1:00 p.m.–4:15 p.m. *Online Homework—Innovation and Assessment, I*, Room 2009, 2nd Floor, Moscone

1:00 p.m.–3:55 p.m. *Preparing K-12 Teachers to Teach Algebra, II*, Room 3002, 3rd Floor, Moscone

1:00 p.m.–3:35 p.m. *How Assessment Results Changed Our Program*, Room 2011, 2nd Floor, Moscone

1:00 p.m.–4:15 p.m. *Wavelets in Undergraduate Education*, Room 2022, 2nd Floor, Moscone

**Program at a Glance – Thursday, January 14**

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1:00 p.m.–4:06 p.m.	<b>SIAM MINISYMPOSIUM ON MATHEMATICS AND A SMART PLANET,</b> Room 2002, 2nd Floor, Moscone
1:00 p.m.–2:30 p.m.	<b>JOINT COMMITTEE ON WOMEN IN THE MATHEMATICAL SCIENCES PANEL DISCUSSION</b> <i>Hard problems, approximate solutions: Finding balance between math and family demands.</i> , Room 3003, 3rd Floor, Moscone
1:00 p.m.–2:20 p.m.	<b>MAA COMMITTEE ON GRADUATE STUDENTS-YMN PANEL DISCUSSION</b> <i>Finding a research topic and thesis advisor.</i> , Room 3006, 3rd Floor, Moscone
1:00 p.m.–2:20 p.m.	<b>SIGMAA ON STATISTICS EDUCATION PANEL DISCUSSION</b> <i>Statistics ≠ mathematics: What a first- (or second-) time teacher of statistics should know.</i> , Room 3004, 3rd Floor, Moscone
1:00 p.m.–4:15 p.m.	<b>SIGMAA ON MATH CIRCLES FOR STUDENTS AND TEACHERS, PART I</b> <i>Fostering, supporting, and propagating Math Circles (Part II is Saturday at 1:00 p.m.).</i> , Pacific J, Marriott San Francisco
1:00 p.m.–4:00 p.m.	<b>SUMMER PROGRAM FOR WOMEN IN MATHEMATICS (SPWM) REUNION,</b> Room 3014, 3rd Floor, Moscone
	<b>AMS SPECIAL SESSIONS</b>
1:30 p.m.–4:20 p.m.	<i>Arithmetic of Function Fields, II</i> , Room 3009, 3rd Floor, Moscone
2:00 p.m.–4:00 p.m.	<b>MAA POSTER SESSION ON PROJECTS SUPPORTED BY THE NSF DIVISION OF UNDERGRADUATE EDUCATION</b> , Room 3001, 3rd Floor, Moscone
2:15 p.m.–3:05 p.m.	<b>AMS INVITED ADDRESS</b> <i>Laplacians on vector bundles on graphs.</i> Richard W. Kenyon, Main Lecture Room, 2nd Floor, Moscone
2:30 p.m.–3:45 p.m.	<b>MAA-PROJECT NEXT PANEL DISCUSSION</b> <i>Mathematics and social justice.</i> , Room 3024, 3rd Floor, Moscone
2:35 p.m.–3:50 p.m.	<b>MAA CRAFTY PANEL DISCUSSION</b> <i>More voices from the partner disciplines: The second round of curriculum foundations workshops.</i> , Room 3006, 3rd Floor, Moscone
2:35 p.m.–3:50 p.m.	<b>SIGMAA ON STATISTICS EDUCATION AND SIGMAA ON RESEARCH IN UNDERGRADUATE MATHEMATICS EDUCATION PANEL DISCUSSION</b> <i>Excuse me; where is the department of statistics education?</i> , Room 3004, 3rd Floor, Moscone
2:45 p.m.–4:15 p.m.	<b>AMS COMMITTEE ON THE PROFESSION PANEL DISCUSSION</b> <i>What I wish I had known when applying for a job.</i> , Room 3003, 3rd Floor, Moscone
3:20 p.m.–4:10 p.m.	<b>AMS RETIRING PRESIDENTIAL ADDRESS</b> <i>Reflections and prospectives.</i> James G. Glimm, Main Lecture Room, 2nd Floor, Moscone
4:25 p.m.–5:25 p.m.	<b>JOINT PRIZE SESSION</b> , Main Lecture Room, 2nd Floor, Moscone
5:30 p.m.–6:30 p.m.	<b>SIGMAA ON ENVIRONMENTAL MATHEMATICS GUEST LECTURE</b> <i>Speaker and title to be announced.</i> , Room 2020, 2nd Floor, Moscone
5:30 p.m.–7:00 p.m.	<b>HAWKES LEARNING SYSTEMS PRESENTATION</b> , Room 2004, 2nd Floor, Moscone
5:30 p.m.–6:30 p.m.	<b>JOINT PRIZE SESSION RECEPTION</b> , Room 2006, 2nd Floor, Moscone
5:45 p.m.–6:45 p.m.	<b>SIGMAA ON BUSINESS, INDUSTRY, AND GOVERNMENT GUEST LECTURE</b> , Room 3006, 3rd Floor, Moscone
5:45 p.m.–7:15 p.m.	<b>SIGMAA ON STATISTICS EDUCATION BUSINESS MEETING AND RECEPTION</b> , Room 3002, 3rd Floor, Moscone
5:45 p.m.–6:30 p.m.	<b>SIGMAA ON MATHEMATICS INSTRUCTION USING THE WEB RECEPTION AND BUSINESS MEETING</b> , Room 3004, 3rd Floor, Moscone
5:45 p.m.–7:30 p.m.	<b>MAA TWO-YEAR COLLEGE RECEPTION</b> , Pacific J, Marriott San Francisco

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**Thursday, January 14 – Program at a Glance**

5:45 p.m.–7:30 p.m.	<b>UNIVERSITY OF WISCONSIN-MADISON RECEPTION FOR ALUMNI AND FRIENDS</b> , Foothill F, Marriott San Francisco
6:00 p.m.–7:00 p.m.	<b>MAA SPECIAL PRESENTATION FOR STUDENTS</b> , <i>Low-dimensional topology for fun and profit, or how to extract money from the R4 space.</i> , Room 2022, 2nd Floor, Moscone
6:00 p.m.–7:30 p.m.	<b>SIGMAA ON RESEARCH IN UNDERGRADUATE MATHEMATICS EDUCATION BUSINESS MEETING</b> , Room 2024, 2nd Floor, Moscone
6:00 p.m.–7:00 p.m.	<b>UNIVERSITY OF CHICAGO MATHEMATICS ALUMNI RECEPTION</b> , Pacific C, Marriott San Francisco
6:00 p.m.–8:00 p.m.	<b>CALIFORNIA STATE UNIVERSITY ALUMNI RECEPTION</b> , Pacific A, Marriott San Francisco
6:00 p.m.–7:30 p.m.	<b>THE GEORGE WASHINGTON UNIVERSITY DEPARTMENT OF MATHEMATICS RECEPTION</b> , Pacific E, Marriott San Francisco
6:00 p.m.–7:30 p.m.	<b>ASSOCIATION OF LESBIAN, GAY, BISEXUAL AND TRANSGENDERED MATHEMATICIANS RECEPTION</b> , Foothill D, Marriott San Francisco
6:00 p.m.–8:00 p.m.	<b>RECEPTION FOR ALUMNI AND FRIENDS OF THE NORTH CAROLINA STATE UNIVERSITY DEPARTMENT OF MATHEMATICS</b> , Foothill H, Marriott San Francisco
6:00 p.m.–7:30 p.m.	<b>NEW MEXICO STATE UNIVERSITY RECEPTION</b> , Pacific F, Marriott San Francisco
6:00 p.m.–7:00 p.m.	<b>7CITY LEARNING INFORMATION SESSION</b> <i>If you have an interest in financial markets, come to this Certificate in Quantitative finance (CQF) informal session.</i> , Pacific H, Marriott San Francisco
6:30 p.m.–7:00 p.m.	<b>SIGMAA ON ENVIRONMENTAL MATHEMATICS BUSINESS MEETING</b> , Room 2020, 2nd Floor, Moscone
6:30 p.m.–7:30 p.m.	<b>SIGMAA ON MATHEMATICS INSTRUCTION USING THE WEB PRESENTATION AND DISCUSSION</b> <i>Life after Wolfram Alpha.</i> , Room 3004, 3rd Floor, Moscone
6:30 p.m.–9:00 p.m.	<b>MER BANQUET</b> , Foothill G, Marriott San Francisco
6:30 p.m.–7:30 p.m.	<b>UNIVERSITY OF OREGON MATHEMATICS DEPARTMENT RECEPTION FOR ALUMNI AND FRIENDS</b> , Pacific B, Marriott San Francisco
7:00 p.m.–9:00 p.m.	<b>SIGMAA ON MATHEMATICS AND THE ARTS SPECIAL PRESENTATION</b> <i>Open mike mathematical poetry reading.</i> , Room 2009, 2nd Floor, Moscone
7:15 p.m.–8:00 p.m.	<b>SIGMAA ON BUSINESS, INDUSTRY, AND GOVERNMENT RECEPTION</b> , Room 3006, 3rd Floor, Moscone
7:30 p.m.–8:30 p.m.	<b>YOUNG MATHEMATICIANS' NETWORK OPEN FORUM</b> , Sierra C, Marriott San Francisco
8:15 p.m.–9:45 p.m.	<b>KNITTING CIRCLE</b> , Pacific I, Marriott San Francisco

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**Friday, January 15**

7:30 a.m.–4:00 p.m.	<b>JOINT MEETINGS REGISTRATION</b> , First Floor Lobby, Moscone
<b>AMS SPECIAL SESSIONS</b>	
7:30 a.m.–10:50 a.m.	<i>Mathematics and Physical Experiment, I</i> , Room 2000, 2nd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Research in Mathematics by Undergraduates, I (AMS-MAA-SIAM)</i> , Room 2024, 2nd Floor, Moscone
8:00 a.m.–10:50 a.m.	<i>Spectral Problems on Compact Riemannian Manifolds, I (AMS-AWM)</i> , Room 3014, 3rd Floor, Moscone

## **Program at a Glance – Friday, January 15**

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- 8:00 a.m.–10:50 a.m. *Nonlinear Hyperbolic Equations and Control Systems in Physics and Engineering, II*, Room 2006, 2nd Floor, Moscone  
8:00 a.m.–10:50 a.m. *Biomathematics: Modeling in Biology, Ecology, and Epidemiology, I*, Room 3007, 3rd Floor, Moscone  
8:00 a.m.–10:50 a.m. *Enumerative Combinatorics, I*, Room 3005, 3rd Floor, Moscone  
8:00 a.m.–10:50 a.m. *L-Functions and Analytic Number Theory, I*, Room 3009, 3rd Floor, Moscone  
8:00 a.m.–10:50 a.m. *Representation Theory and Nonassociative Algebras, II*, Room 3011, 3rd Floor, Moscone  
8:00 a.m.–9:50 a.m. *Arithmetic and Nonarchimedean Dynamics, III*, Room 2012, 2nd Floor, Moscone

### **MAA INVITED PAPER SESSIONS**

- 8:00 a.m.–10:50 a.m. *Mathematics and Education Reform, II: Climate, Sustainability, and the Curriculum (MAA-AMS-MER)*, Room 3008, 3rd Floor, Moscone  
8:00 a.m.–10:55 a.m. *The Mathematics of Origami*, Room 3006, 3rd Floor, Moscone

### **AMS CONTRIBUTED PAPER SESSIONS**

- 8:00 a.m.–10:55 a.m. *Differential and Difference Equations, III*, Room 3018, 3rd Floor, Moscone  
8:00 a.m.–10:55 a.m. *Biomathematics, III*, Room 3020, 3rd Floor, Moscone  
8:00 a.m.–10:25 a.m. *Difference Equations and Time Scales*, Room 3012, 3rd Floor, Moscone  
8:00 a.m.–10:55 a.m. *Approximations*, Room 2007, 2nd Floor, Moscone  
8:00 a.m.–10:55 a.m. *Functional Analysis and Operator Theory, I*, Room 3016, 3rd Floor, Moscone  
8:00 a.m.–10:40 a.m. *Algebraic Geometry*, Room 3022, 3rd Floor, Moscone

### **MAA CONTRIBUTED PAPER SESSIONS**

- 8:00 a.m.–10:55 a.m. *Undergraduate Mathematical Biology, I*, Room 2009, 2nd Floor, Moscone  
8:00 a.m.–10:55 a.m. *General Contributed Papers, VII*, Room 3000, 3rd Floor, Moscone  
8:00 a.m.–10:50 a.m. *Mathematics, Equity, Diversity, and Social Justice, II*, Room 2022, 2nd Floor, Moscone  
8:00 a.m.–10:55 a.m. *Mathematics Courses for the Liberal Arts Students, III*, Room 2011, 2nd Floor, Moscone  
8:00 a.m.–10:55 a.m. *Quantitative Reasoning and the Environment*, Room 2020, 2nd Floor, Moscone  
8:00 a.m.–10:55 a.m. **SIAM MINISYMPOSIUM ON GRAPH THEORY, I**, Room 2002, 2nd Floor, Moscone  
8:00 a.m.–11:00 a.m. **PME COUNCIL MEETING**, Sierra F, Marriott San Francisco  
**EMPLOYMENT CENTER**, Exhibit Hall, Moscone

### **AMS CONTRIBUTED PAPER SESSIONS**

- 8:15 a.m.–10:55 a.m. *History of Mathematics*, Room 3010, 3rd Floor, Moscone  
8:15 a.m.–10:40 a.m. *Discrete Mathematics, IV*, Room 3003, 3rd Floor, Moscone

### **AMS SPECIAL SESSION**

- 8:30 a.m.–10:50 a.m. *Interactions of Inverse Problems, Signal Processing, and Imaging, II*, Room 2010, 2nd Floor, Moscone

- 8:30 a.m.–10:30 a.m. **AMS-MAA GRADUATE STUDENT FAIR** Undergrads! Take this opportunity to meet representatives from mathematical sciences graduate programs., Room 3001, 3rd Floor, Moscone

### **MAA CONTRIBUTED PAPER SESSION**

- 8:40 a.m.–10:55 a.m. *Online Homework—Innovation and Assessment, II*, Room 3002, 3rd Floor, Moscone

- 9:00 a.m.–9:50 a.m. **MAA INVITED ADDRESS** Motion Planning and Graph Layout: at the Crossroads of Geometry, Discrete Mathematics, and Algorithm Design. Sue Whitesides, Main Lecture Room, 2nd Floor, Moscone

- 9:00 a.m.–9:50 a.m. **ASL INVITED ADDRESS** *Expansions of o-minimal structures by trajectories of definable vector fields.* Chris Miller, Room 2004, 2nd Floor, Moscone
- 9:00 a.m.–11:00 a.m. **MAA MINICOURSE #13: PART B** *Taking symbols seriously: Teaching form and function in college algebra.*, Pacific J, Marriott San Francisco
- 9:00 a.m.–11:00 a.m. **MAA MINICOURSE #4: PART B** *Using video-case studies in teaching a proof-based gateway course to the mathematics major.*, Pacific H, Marriott San Francisco
- 9:00 a.m.–11:00 a.m. **MAA MINICOURSE #7: PART B** *Teaching with clickers in the classroom.*, Pacific I, Marriott San Francisco
- 9:00 a.m.–5:00 p.m. **STUDENT HOSPITALITY CENTER**, South Lobby, 2nd Floor, Moscone
- 9:00 a.m.–10:20 a.m. **MAA-YOUNG MATHEMATICIANS' NETWORK PANEL DISCUSSION**  
*Promotion and tenure: You know you want it.*, Room 3004, 3rd Floor, Moscone
- 9:30 a.m.–11:00 a.m. **AMS SPECIAL PRESENTATION** *A conversation on nonacademic employment.*, Room 2008, 2nd Floor, Moscone
- 9:30 a.m.–5:00 p.m. **EXHIBITS AND BOOK SALES**, Exhibit Hall, Moscone
- 10:00 a.m.–10:50 a.m. **ASL INVITED ADDRESS** *Ramsey theory for finite structures.* Slawomir J. Solecki, Room 2004, 2nd Floor, Moscone
- 10:00 a.m.–10:50 a.m. **AMS SPECIAL SESSION**  
*Use of Technology in Modern Complex Analysis Research, II*, Room 2012, 2nd Floor, Moscone
- 10:05 a.m.–10:55 a.m. **AMS INVITED ADDRESS** *Zonotopal algebra, analysis, and combinatorics.* Olga Holtz, Main Lecture Room, 2nd Floor, Moscone
- 11:10 a.m.–12:00 p.m. **AMS-MAA INVITED ADDRESS** *Evolving curves and surfaces.* Brian White, Main Lecture Room, 2nd Floor, Moscone
- 12:00 p.m.–1:00 p.m. **MAA POSTER SESSION ON RESEARCH BY UNDERGRADUATE STUDENTS**  
*Students must set up their posters during this hour.*, North Lobby, 3rd Floor, Moscone
- 1:00 p.m.–2:00 p.m. **AMS COLLOQUIUM LECTURES: LECTURE III** *Reduced decompositions.* Richard P. Stanley, Main Lecture Room, 2nd Floor, Moscone
- 1:00 p.m.–1:50 p.m. **MAA LECTURE FOR STUDENTS** *How math made modern music mad Irrational!* David T. Kung, Room 3014, 3rd Floor, Moscone
- 1:00 p.m.–4:45 p.m. **AMS CURRENT EVENTS BULLETIN**, Room 3022, 3rd Floor, Moscone
- 1:00 p.m.–5:20 p.m. **AMS SPECIAL SESSIONS**  
*Research in Mathematics by Undergraduates, II (AMS-MAA-SIAM)*, Room 2000, 2nd Floor, Moscone
- 1:00 p.m.–6:20 p.m. *History of Mathematics, I (AMS-MAA)*, Room 2010, 2nd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Spectral Problems on Compact Riemannian Manifolds, II (AMS-AWM)*, Room 3003, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Commutative Algebra, II*, Room 3011, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Enumerative Combinatorics, II*, Room 3005, 3rd Floor, Moscone
- 1:00 p.m.–6:20 p.m. *Differential Galois Theory and Group Representations: A Tribute to Andy Magid, I*, Room 3007, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *L-Functions and Analytic Number Theory, II*, Room 3009, 3rd Floor, Moscone
- 1:00 p.m.–6:50 p.m. *Recent Advances in Evolution Equations and Applications*, Room 2006, 2nd Floor, Moscone
- 1:00 p.m.–5:40 p.m. *The Mathematics of Information and Knowledge, II*, Room 2012, 2nd Floor, Moscone

## Program at a Glance – Friday, January 15

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### **MAA INVITED PAPER SESSION**

1:00 p.m.–5:50 p.m. *Mathematics and Education Reform, III: Refocusing Algebra: From Middle School to College (MAA-AMS-MER)*, Room 3008, 3rd Floor, Moscone

### **AMS CONTRIBUTED PAPER SESSIONS**

1:00 p.m.–6:10 p.m. *Differential and Difference Equations, IV*, Room 3018, 3rd Floor, Moscone

1:00 p.m.–3:55 p.m. *Mathematics Education*, Room 3010, 3rd Floor, Moscone

1:00 p.m.–3:40 p.m. *Discrete Mathematics, V*, Room 3006, 3rd Floor, Moscone

1:00 p.m.–5:25 p.m. *Dynamical Systems*, Room 3020, 3rd Floor, Moscone

1:00 p.m.–5:40 p.m. *Computational Mathematics, II*, Room 3012, 3rd Floor, Moscone

1:00 p.m.–5:40 p.m. *Functional Analysis and Operator Theory, II*, Room 3016, 3rd Floor, Moscone

### **MAA CONTRIBUTED PAPER SESSIONS**

1:00 p.m.–5:55 p.m. *Arts and Mathematics, I*, Room 2022, 2nd Floor, Moscone

1:00 p.m.–1:35 p.m. *Undergraduate Mathematical Biology, II*, Room 3002, 3rd Floor, Moscone

1:00 p.m.–5:55 p.m. *General Contributed Papers, VIII*, Room 3000, 3rd Floor, Moscone

1:00 p.m.–4:45 p.m. *Philosophy of Mathematics for Working Mathematicians*, Room 2009, 2nd Floor, Moscone

1:00 p.m.–5:15 p.m. *Publishing Mathematics on the Web*, Room 2011, 2nd Floor, Moscone

1:00 p.m.–4:55 p.m. *Research on the Teaching and Learning of Undergraduate Mathematics, I*, Room 2020, 2nd Floor, Moscone

1:00 p.m.–5:55 p.m. **SIAM MINISYMPOSIUM ON GRAPH THEORY, II**, Room 2002, 2nd Floor, Moscone

1:00 p.m.–3:25 p.m. **NAM GRANVILLE-BROWN-HAYES SESSION OF PRESENTATIONS BY RECENT DOCTORAL RECIPIENTS IN THE MATHEMATICAL SCIENCES**, Room 2008, 2nd Floor, Moscone

1:00 p.m.–3:00 p.m. **AMS-MAA COMMITTEE ON TEACHING ASSISTANTS AND PART-TIME INSTRUCTORS PANEL DISCUSSION** *Becoming a teacher of college mathematics: Video cases for novice college mathematics instructor professional development.*, Room 3004, 3rd Floor, Moscone

### **AMS CONTRIBUTED PAPER SESSION**

1:15 p.m.–5:55 p.m. *Algebras, I*, Room 2007, 2nd Floor, Moscone

2:00 p.m.–2:50 p.m. **ASL INVITED ADDRESS** *Randomness and computational strength*. Joseph S. Miller, Room 2004, 2nd Floor, Moscone

### **MAA CONTRIBUTED PAPER SESSION**

2:00 p.m.–4:55 p.m. *Online Homework—Innovation and Assessment, III*, Room 3002, 3rd Floor, Moscone

2:15 p.m.–4:15 p.m. **MAA MINICOURSE #11: PART B** *The mathematics of Islam and its use in the teaching of mathematics.*, Pacific I, Marriott San Francisco

2:15 p.m.–4:15 p.m. **MAA MINICOURSE #12: PART B** *Learning discrete mathematics via historical projects.*, Pacific J, Marriott San Francisco

2:15 p.m.–4:15 p.m. **MAA MINICOURSE #6: PART B** *Developing departmental self-studies.*, Pacific H, Marriott San Francisco

2:15 p.m.–4:10 p.m. **ROCKY MOUNTAIN MATHEMATICS CONSORTIUM BOARD OF DIRECTORS MEETING**, Foothill G2, Marriott San Francisco

2:30 p.m.–4:00 p.m. **MAA PRESENTATIONS BY TEACHING AWARD RECIPIENTS**, Room 2024, 2nd Floor, Moscone

2:30 p.m.–4:00 p.m. **AMS COMMITTEE ON SCIENCE POLICY PANEL DISCUSSION** *Evaluation of the NSF's VIGRE program.*, Room 3014, 3rd Floor, Moscone

2:30 p.m.–4:00 p.m.	<b>MAA POSTER SESSION ON RESEARCH BY UNDERGRADUATE STUDENTS</b> <i>Judging of all posters will take place during this time.,</i> North Lobby, 3rd Floor, Moscone
3:00 p.m.–3:50 p.m.	<b>ASL INVITED ADDRESS</b> <i>Bar-recursive interpretations of classical analysis.</i> Fernando J. Ferreira, Room 2004, 2nd Floor, Moscone
	<b>MAA CONTRIBUTED PAPER SESSION</b> <i>Mathematics and Sports, I,</i> Room 3004, 3rd Floor, Moscone
3:20 p.m.–3:55 p.m.	<b>MAA POSTER SESSION ON RESEARCH BY UNDERGRADUATE STUDENTS</b> <i>All participants are invited to view the posters and speak with the presenters.,</i> North Lobby, 3rd Floor, Moscone
4:00 p.m.–5:30 p.m.	
4:10 p.m.–5:45 p.m.	<b>ASL SESSION FOR CONTRIBUTED PAPERS</b> , Room 2004, 2nd Floor, Moscone
4:30 p.m.–6:30 p.m.	<b>AMS CONGRESSIONAL FELLOWSHIP SESSION</b> , Room 2008, 2nd Floor, Moscone
5:00 p.m.–7:00 p.m.	<b>MAA PANEL DISCUSSION</b> <i>Current issues in actuarial science education.,</i> Room 3004, 3rd Floor, Moscone
5:00 p.m.–6:00 p.m.	<b>SIGMAA ON QUANTITATIVE LITERACY BUSINESS MEETING</b> , Room 2024, 2nd Floor, Moscone
5:15 p.m.–7:15 p.m.	<b>SIGMAA ON THE PHILOSOPHY OF MATHEMATICS BUSINESS MEETING, RECEPTION, AND GUEST LECTURE</b> , Room 2009, 2nd Floor, Moscone
5:30 p.m.–7:30 p.m.	<b>UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN DEPARTMENT OF MATHEMATICS ALUMNI RECEPTION</b> , Sierra H, Marriott San Francisco
5:30 p.m.–7:00 p.m.	<b>UNIVERSITY OF MICHIGAN ALUMNI AND FRIENDS RECEPTION</b> , Pacific C, Marriott San Francisco
6:00 p.m.–8:00 p.m.	<b>SIGMAA ON MATHEMATICAL AND COMPUTATIONAL BIOLOGY BUSINESS MEETING AND GUEST LECTURE</b> , Room 3006, 3rd Floor, Moscone
6:00 p.m.–7:00 p.m.	<b>MAA SPECIAL THEATRICAL PRESENTATION</b> <i>The theater of the mathematically absurd.,</i> Room 2020, 2nd Floor, Moscone
6:00 p.m.–10:00 p.m.	<b>ASSOCIATION OF CHRISTIANS IN THE MATHEMATICAL SCIENCES BANQUET</b> , Grand Ballroom B&C, Intercontinental
6:00 p.m.–8:00 p.m.	<b>BUDAPEST SEMESTERS IN MATHEMATICS REUNION</b> , Sierra K, Marriott San Francisco
6:00 p.m.–7:30 p.m.	<b>ALUMNI AND FRIENDS OF BRIGHAM YOUNG UNIVERSITY MATHEMATICS RECEPTION</b> , Pacific F, Marriott San Francisco
6:00 p.m.–7:00 p.m.	<b>AMS MATHEMATICAL REVIEWS RECEPTION</b> , Foothill G, Marriott San Francisco
6:00 p.m.–9:30 p.m.	<b>NAM BANQUET</b> , Club Room, Marriott San Francisco
6:00 p.m.–8:00 p.m.	<b>THE OHIO STATE UNIVERSITY FRIENDS AND ALUMNI RECEPTION</b> , Pacific B, Marriott San Francisco
7:00 p.m.–8:00 p.m.	<b>SIGMAA ON MATHEMATICS AND THE ARTS BUSINESS MEETING</b> , Room 2024, 2nd Floor, Moscone
7:30 p.m.–8:15 p.m.	<b>NAM COX-TALBOT ADDRESS</b> <i>The Number Zero: Its Origin and Use.</i> Abdulalim Abdullah Shabazz, Club Room, Marriott San Francisco
8:00 p.m.–9:00 p.m.	<b>SIGMAA ON MATHEMATICS AND THE ARTS SPECIAL PRESENTATION</b> <i>Bruce Beasley will discuss his sculptures which consist of intersecting forms that are developed using a computer program.,</i> Room 2024, 2nd Floor, Moscone
8:30 p.m.–10:30 p.m.	<b>MAA-PROJECT NExT RECEPTION</b> <i>All Project NExT Fellows, consultants, and other friends of Project NExT are invited.,</i> Atrium, Marriott San Francisco

## Saturday, January 16

7:00 a.m.–8:45 a.m. **MAA MINORITY CHAIRS BREAKFAST MEETING**, Foothill D, Marriott San Francisco

7:30 a.m.–2:00 p.m. **JOINT MEETINGS REGISTRATION**, First Floor Lobby, Moscone

### **AMS SPECIAL SESSIONS**

7:30 a.m.–10:50 a.m. *Biomathematics: Modeling in Biology, Ecology, and Epidemiology, II*, Room 3003, 3rd Floor, Moscone

7:30 a.m.–10:50 a.m. *Mathematics and Physical Experiment, II*, Room 3007, 3rd Floor, Moscone

### **AMS CONTRIBUTED PAPER SESSION**

7:45 a.m.–8:55 a.m. *Probability and Statistics, IV*, Room 3010, 3rd Floor, Moscone

### **AMS SPECIAL SESSIONS**

8:00 a.m.–10:50 a.m. *Research in Mathematics by Undergraduates, III (AMS-MAA-SIAM)*, Room 2000, 2nd Floor, Moscone

8:00 a.m.–10:50 a.m. *History of Mathematics, II (AMS-MAA)*, Room 2010, 2nd Floor, Moscone

8:00 a.m.–10:50 a.m. *Applications of Algebraic Geometry, I (AMS-SIAM)*, Room 3005, 3rd Floor, Moscone

8:00 a.m.–10:50 a.m. *Categorical and Algebraic Methods in Representation Theory, I*, Room 3009, 3rd Floor, Moscone

8:00 a.m.–10:40 a.m. *Harmonic Analysis and Representations of Reductive  $p$ -adic Groups, I*, Room 3011, 3rd Floor, Moscone

8:00 a.m.–10:50 a.m. *Integrability of Dynamical Systems and Solitons Equations, I*, Room 3016, 3rd Floor, Moscone

8:00 a.m.–10:50 a.m. *Interactions of Inverse Problems, Signal Processing, and Imaging, III*, Room 2022, 2nd Floor, Moscone

8:00 a.m.–10:50 a.m. *Optimal Frames and Operator Algebras, I*, Room 2012, 2nd Floor, Moscone

8:00 a.m.–10:40 a.m. *Parabolic Geometries, Integrable Systems, and Twistor Theory, I*, Room 2006, 2nd Floor, Moscone

### **MAA INVITED PAPER SESSION**

8:00 a.m.–10:50 a.m. *The Scholarship of Teaching and Learning in Mathematics (MAA-AMS)*, Room 3008, 3rd Floor, Moscone

### **AMS CONTRIBUTED PAPER SESSIONS**

8:00 a.m.–10:55 a.m. *Computational Mathematics, III*, Room 3012, 3rd Floor, Moscone

8:00 a.m.–10:55 a.m. *Research by Undergraduates, I*, Room 3018, 3rd Floor, Moscone

8:00 a.m.–10:40 a.m. *Number Theory, III*, Room 3020, 3rd Floor, Moscone

### **MAA CONTRIBUTED PAPER SESSIONS**

8:00 a.m.–10:55 a.m. *Innovative and Effective Ways to Teach Linear Algebra, I*, Room 2020, 2nd Floor, Moscone

8:00 a.m.–10:55 a.m. *General Contributed Papers, IX*, Room 3000, 3rd Floor, Moscone

8:00 a.m.–10:55 a.m. *Mathematics and Sports, II*, Room 2011, 2nd Floor, Moscone

8:00 a.m.–9:35 a.m. *Visualization in Mathematics, I*, Room 2009, 2nd Floor, Moscone

**SIAM MINISYMPOSIUM ON NEW TRENDS IN MATHEMATICAL BIOLOGY**, Room 2002, 2nd Floor, Moscone

### **AMS CONTRIBUTED PAPER SESSION**

8:15 a.m.–10:55 a.m. *Group Theory, III*, Room 3022, 3rd Floor, Moscone

**AWM WORKSHOP** This session has several parts that will be listed separately by time in this program. All presentations are open to all JMM participants., Room 2007, 2nd Floor, Moscone

	<b>AMS SPECIAL SESSION</b> <i>Permutations, I</i> , Room 3001, 3rd Floor, Moscone
8:30 a.m.–10:50 a.m.	
	<b>MAA CONTRIBUTED PAPER SESSION</b> <i>General Contributed Papers, XI</i> , Room 3002, 3rd Floor, Moscone
8:30 a.m.–10:25 a.m.	
8:30 a.m.–10:20 a.m.	<b>AWM WORKSHOP: RESEARCH PRESENTATIONS BY RECENT PH.D.'S, I</b> , Room 2007, 2nd Floor, Moscone
8:30 a.m.–10:00 a.m.	<b>AMS COMMITTEE ON EDUCATION PANEL DISCUSSION</b> <i>The common core State Standards: Will they become our national K–12 math curriculum?</i> , Room 3014, 3rd Floor, Moscone
	<b>MAA CONTRIBUTED PAPER SESSION</b> <i>General Contributed Papers, X</i> , Room 2024, 2nd Floor, Moscone
8:45 a.m.–10:40 a.m.	
9:00 a.m.–9:50 a.m.	<b>AMS INVITED ADDRESS</b> <i>Evolution problem in General Relativity</i> . <b>Igor Y. Rodnianski</b> , Main Lecture Room, 2nd Floor, Moscone
9:00 a.m.–9:50 a.m.	<b>ASL INVITED ADDRESS</b> <i>Decidability and Undecidability in Theories of Real Vector Spaces</i> . <b>John Harrison</b> , Room 2004, 2nd Floor, Moscone
9:00 a.m.–11:00 a.m.	<b>MAA MINICOURSE #10: PART B</b> <i>The hitchhiker's guide to mathematics.</i> , Pacific J, Marriott San Francisco
9:00 a.m.–11:00 a.m.	<b>MAA MINICOURSE #3: PART B</b> <i>Educating about the state of the planet and sustainability while enhancing calculus.</i> , Pacific H, Marriott San Francisco
9:00 a.m.–11:00 a.m.	<b>MAA MINICOURSE #8: PART B</b> <i>The Fibonacci and Catalan numbers.</i> , Pacific I, Marriott San Francisco
9:00 a.m.–2:00 p.m.	<b>STUDENT HOSPITALITY CENTER</b> , South Lobby, 2nd Floor, Moscone
9:00 a.m.–10:20 a.m.	<b>MAA COMMITTEE FOR THE TEACHING OF UNDERGRADUATE MATHEMATICS PANEL DISCUSSION</b> <i>Beyond grading and tutoring: New approaches to students helping students.</i> , Room 3004, 3rd Floor, Moscone
9:00 a.m.–9:50 a.m.	<b>NAM PANEL DISCUSSION</b> , Room 2008, 2nd Floor, Moscone
9:00 a.m.–12:00 p.m.	<b>EXHIBITS AND BOOK SALES</b> , Exhibit Hall, Moscone
9:00 a.m.–12:00 p.m.	<b>EMPLOYMENT CENTER</b> , Exhibit Hall, Moscone
	<b>AMS CONTRIBUTED PAPER SESSION</b> <i>Real and Special Functions</i> , Room 3010, 3rd Floor, Moscone
9:15 a.m.–10:55 a.m.	
10:00 a.m.–10:50 a.m.	<b>ASL INVITED ADDRESS</b> <i>Tukey Reducibility as a Setup for Classifying Mathematical Structures</i> . <b>Stevo Todorcevic</b> , Room 2004, 2nd Floor, Moscone
10:00 a.m.–10:50 a.m.	<b>NAM BUSINESS MEETING</b> , Room 2008, 2nd Floor, Moscone
10:05 a.m.–10:55 a.m.	<b>MAA INVITED ADDRESS</b> <i>Symplectic embeddings and continued fractions</i> . <b>Dusa McDuff</b> , Main Lecture Room, 2nd Floor, Moscone
10:30 a.m.–11:00 a.m.	<b>AWM WORKSHOP: POSTER SESSION WITH PRESENTATIONS FROM WOMEN GRADUATE STUDENTS</b> , Room 2007, 2nd Floor, Moscone
11:10 a.m.–11:40 a.m.	<b>MAA BUSINESS MEETING</b> , Main Lecture Room, 2nd Floor, Moscone
11:45 a.m.–12:15 p.m.	<b>AMS BUSINESS MEETING</b> , Main Lecture Room, 2nd Floor, Moscone
1:00 p.m.–2:00 p.m.	<b>NAM CLAYTOR-WOODARD LECTURE</b> <i>The Impact of Periodic Proportional Harvesting Policies on TAC-Regulated Fishery Systems</i> . <b>Abdul-Aziz Yakubu</b> , Room 2008, 2nd Floor, Moscone
	<b>AMS SPECIAL SESSIONS</b>
1:00 p.m.–5:50 p.m.	<i>Research in Mathematics by Undergraduates, IV (AMS-MAA-SIAM)</i> , Room 2000, 2nd Floor, Moscone
1:00 p.m.–5:50 p.m.	<i>History of Mathematics, III (AMS-MAA)</i> , Room 2010, 2nd Floor, Moscone

## Program at a Glance – Saturday, January 16

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- 1:00 p.m.–5:50 p.m. *Applications of Algebraic Geometry, II (AMS-SIAM)*, Room 3005, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Biomathematics: Modeling in Biology, Ecology, and Epidemiology, III*, Room 3003, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Categorical and Algebraic Methods in Representation Theory, II*, Room 3009, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Differential Galois Theory and Group Representations: A Tribute to Andy Magid, II*, Room 3007, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Harmonic Analysis and Representations of Reductive  $p$ -adic Groups, II*, Room 3011, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Integrability of Dynamical Systems and Solitons Equations, II*, Room 3016, 3rd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Optimal Frames and Operator Algebras, II*, Room 2012, 2nd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Parabolic Geometries, Integrable Systems, and Twistor Theory, II*, Room 2006, 2nd Floor, Moscone
- 1:00 p.m.–5:50 p.m. *Permutations, II*, Room 3001, 3rd Floor, Moscone
- 1:00 p.m.–3:00 p.m. **MAA MINICOURSE #1: PART B** *Remodeling data analysis.*, Pacific H, Marriott San Francisco
- 1:00 p.m.–3:00 p.m. **MAA MINICOURSE #5: PART B** *Active learning approaches for the foundational mathematics for elementary teachers courses.*, Pacific I, Marriott San Francisco

### AMS CONTRIBUTED PAPER SESSIONS

- 1:00 p.m.–5:25 p.m. *Geometry and Topology, IV*, Room 3012, 3rd Floor, Moscone
- 1:00 p.m.–5:55 p.m. *Research by Undergraduates, II*, Room 3018, 3rd Floor, Moscone
- 1:00 p.m.–4:55 p.m. *Discrete Mathematics, VI*, Room 3010, 3rd Floor, Moscone
- 1:00 p.m.–5:25 p.m. *Optimization and Control*, Room 3022, 3rd Floor, Moscone
- 1:00 p.m.–2:40 p.m. *Computational Math, IV*, Room 3014, 3rd Floor, Moscone

### MAA CONTRIBUTED PAPER SESSIONS

- 1:00 p.m.–5:15 p.m. *Innovative and Effective Ways to Teach Linear Algebra, II*, Room 2022, 2nd Floor, Moscone
- 1:00 p.m.–5:35 p.m. *Arts and Mathematics, II*, Room 2011, 2nd Floor, Moscone
- 1:00 p.m.–5:10 p.m. *General Contributed Papers, XII*, Room 3000, 3rd Floor, Moscone
- 1:00 p.m.–5:35 p.m. *Mathlets for Teaching and Learning Mathematics*, Room 2020, 2nd Floor, Moscone
- 1:00 p.m.–4:55 p.m. *Research on the Teaching and Learning of Undergraduate Mathematics, II*, Room 2024, 2nd Floor, Moscone
- 1:00 p.m.–5:15 p.m. *Visualization in Mathematics, II*, Room 2009, 2nd Floor, Moscone

### SIAM MINISYMPOSIUM ON NEW TRENDS IN MATHEMATICAL METHODS IN IMAGING SCIENCE

- Room 2002, 2nd Floor, Moscone
- MAA COMMITTEE ON TECHNOLOGY IN MATHEMATICS EDUCATION PANEL DISCUSSION** *Technology in teaching mathematics: History and current practices. (There will be a 15-minute break halfway through this discussion)*, Room 3004, 3rd Floor, Moscone

- SIGMAA ON MATH CIRCLES FOR STUDENTS AND TEACHERS, PART II** *Fostering, supporting, and propagating Math Circles.*, Room 3008, 3rd Floor, Moscone

- AWM WORKSHOP PANEL DISCUSSION** *Career opportunities: The early years.*, Room 2007, 2nd Floor, Moscone

### AMS CONTRIBUTED PAPER SESSIONS

- Number Theory, IV*, Room 3020, 3rd Floor, Moscone

**Saturday, January 16 – Program at a Glance**

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2:00 p.m.–2:50 p.m.	<b>ASL INVITED ADDRESS</b> <i>Model theory and nonarchimedean tame topology, with a view towards Berkovich spaces.</i> <b>Francois Loeser</b> , Room 2004, 2nd Floor, Moscone
2:00 p.m.–3:15 p.m.	<b>MAA-PROJECT NEXT PANEL DISCUSSION</b> <i>Organizing and running an effective seminar/capstone course for mathematics majors.</i> , Room 3024, 3rd Floor, Moscone
	<b>AMS CONTRIBUTED PAPER SESSION</b> <i>Algebras, II</i> , Room 2008, 2nd Floor, Moscone
2:30 p.m.–3:40 p.m.	<b>AWM WORKSHOP: RESEARCH PRESENTATIONS BY RECENT PH.D.'S, II</b> , Room 2007, 2nd Floor, Moscone
2:30 p.m.–4:20 p.m.	<b>AMS-MAA-SIAM GERALD AND JUDITH PORTER PUBLIC LECTURE</b> <i>The calculus of friendship, Steven Strogatz</i> Main Lecture Room, 2nd Floor, Moscone <i>Reception immediately following: Please come to greet and chat with the speaker. Light refreshments will be served.</i>
3:00 p.m.–4:45 p.m.	<b>ASL CONTRIBUTED PAPERS, II</b> , Room 2004, 2nd Floor, Moscone
3:10 p.m.–5:20 p.m.	<b>MAA MINICOURSE #2: PART B</b> <i>Using GeoGebra to create activities and applets for visualization and exploration.</i> , Pacific H, Marriott San Francisco
3:30 p.m.–5:30 p.m.	<b>MAA MINICOURSE #9: PART B</b> <i>Getting students involved in undergraduate research.</i> , Pacific I, Marriott San Francisco
5:00 p.m.–6:15 p.m.	<b>RECEPTION IN HONOR OF RETIRING MAA SECRETARY MARTHA SIEGEL</b> , Foothill G, Marriott San Francisco
6:30 p.m.–7:30 p.m.	<b>AMS BANQUET RECEPTION</b> , Club Room, Marriott San Francisco
7:30 p.m.–10:00 p.m.	<b>AMS BANQUET</b> , Atrium, Marriott San Francisco

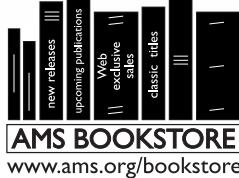
AMERICAN MATHEMATICAL SOCIETY



# AMS BOOKSTORE GIVEAWAY

Enter to win a \$100 AMS Bookstore Gift Certificate

Visit the AMS book exhibit (booths #908-918 at the back of the exhibition space) on the opening day of the Joint Mathematics Meetings in San Francisco, January 13, 2010, to register for the drawing. Entry forms will be accepted until 5:00 pm, and the drawing\* will be held at 5:15 pm.

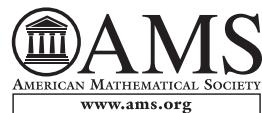


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\*Participants are not required to be present at the drawing to win.



[www.ams.org](http://www.ams.org)

## Social Events

All events listed are open to all registered participants. It is strongly recommended that for any event requiring a ticket, tickets should be purchased through advance registration. Only a very limited number of tickets, if any, will be available for sale on site. If you must cancel your participation in a ticketed event, you may request a 50% refund by returning your ticket(s) to the Mathematics Meetings Service Bureau (MMSB) **by January 4**. After that date no refunds can be made. Special meals are available at banquets upon advance request, but this should have been indicated on the Advance Registration/Housing Form. Special meals may be subject to additional fees.

**AMS Banquet:** As a fitting culmination to the meetings, the AMS banquet provides an excellent opportunity to socialize with fellow participants in a relaxed atmosphere. The participant who has been a member of the Society for the greatest number of years will be recognized and will receive a special award. The banquet will be held on Saturday, with dinner served at 7:30 p.m. Tickets are US\$53 including tax and gratuity. The banquet will be preceded by a reception at 6:30 p.m. Atrium, Marriott.

**Association of Christians in the Mathematical Sciences (ACMS) Reception and Banquet,** Friday, 6:00 p.m.-8:30 p.m. This annual dinner at 6:30 p.m. is preceded by a reception at 6:00 p.m. and will be followed by an after-dinner talk by Glen Van Brummelen. Tickets should have been ordered by **November 30**; see [www.acmsonline.org](http://www.acmsonline.org) for details and cost. Grand Ballroom B&C, Intercontinental Hotel.

**Association of Lesbian, Gay, Bisexual, and Transgendered Mathematicians Reception,** Thursday, 6:00 p.m.-7:30 p.m. This reception is open to all in the GLBT mathematical community as well as partners, friends, and supporters. We have had excellent turnouts, so come and see old friends and make new ones! Foothills D, Marriott.

**AWM Reception:** There is an open reception on Wednesday at 9:30 p.m. after the AMS Gibbs Lecture. This has been a popular, well-attended event in the past. Atrium, Marriott.

**AWM Luncheon to honor Noether Lecturer, Carolyn S. Gordon,** Thursday. Those interested may email [awm@awm-math.org](mailto:awm@awm-math.org); a sign-up sheet for those interested will also be located at the AWM table in the exhibit area and also at the AWM panel discussion and Business Meeting on Wednesday afternoon in room 2007, Moscone West.

**Brigham Young University Reception,** Friday, 6:00 p.m.-7:30 p.m. all friends and alumni, and participants in BYU programs (e.g., CURM, REU, Summer Math Institute) are invited to attend. Please contact Michael Dorff, [mdorff@math.byu.edu](mailto:mdorff@math.byu.edu), for more information. Pacific F, Marriott.

**Budapest Semesters in Mathematics Annual Alumni Reunion,** Friday, 6:00 p.m.-8:00 p.m. All alumni, family, and spouses are invited. Sierra C, Marriott.

**University of Chicago Mathematics Alumni Reception,** Thursday, 6:00 p.m.-7:00 p.m. Pacific C, Marriott.

**Claremont Colleges Alumni Reception,** Thursday, 6:00 p.m.-8:00 p.m. Please join your fellow Claremont College math faculty, alumni, students, and special guests. Hors d'oeuvres and drinks will be provided. Please send your RSVP to [alumni@hmc.edu](mailto:alumni@hmc.edu). Pacific A., Marriott.

**George Washington University Alumni Reception,** Thursday, 6:00 p.m.-7:30 p.m. Please join the Department and Alumni Association at this event for alumni, faculty, and current students. Mingle with old friends, reconnect with the faculty, meet current students, and network with fellow alumni. Pacific E, Marriott.

**Reception for Graduate Students and First-Time Participants,** Wednesday, 5:30 p.m.-6:30 p.m. The AMS and the MAA cosponsor this social hour. Graduate students and first-timers are especially encouraged to come and meet some old-timers to pick up a few tips on how to survive the environment of a large meeting. Refreshments will be served. Atrium, Marriott.

**University of Illinois at Urbana-Champaign Department of Mathematics Alumni Reception,** Friday, 5:30 p.m.-7:30 p.m. Everyone ever connected with the department is encouraged to get together for conversation and to hear about mathematics at the University of Illinois. Please see [www.math.uiuc.edu/jmm-reception.html](http://www.math.uiuc.edu/jmm-reception.html). Sierra H, Marriott.

**Knitting Circle,** Thursday, 8:15 p.m.-9:45 p.m. Bring a project (knitting/crochet/tatting/beading/etc.) and chat with other mathematical crafters! Pacific I, Marriott.

**Reception in Honor of Retiring MAA Secretary Martha Siegel,** Saturday, 5:00 p.m.-6:15 p.m. Tirelessly for 14 years, Martha has served the MAA community well with her strong and fair leadership as Secretary, putting in many hours to overseeing the MAA Executive Committee and



## Social Events

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Board of Governors. Join us and your colleagues in thanking Martha for her dedicated service and wishing Martha well as she moves into the next chapter of her life. Tickets are US\$25 each, including tax and gratuity. The reception features light hors d'oeuvres with cash bar. Foothills G, Marriott.

**MAA-Project NExT Reception**, Friday, 8:30 p.m.-10:30 p.m., organized by **Judith Covington**, University of Louisiana, Shreveport; **Gavin LaRose**, University of Michigan; and **Aparna W. Higgins**, University of Dayton. All Project NExT Fellows, consultants, and other friends of Project NExT are invited. Atrium, Marriott.

**MAA Two-Year College Reception**, Thursday, 5:45 p.m.-7:00 p.m., is open to all meeting participants, particularly two-year faculty members. This is a great opportunity to meet old friends and make some new ones. There will be hot and cold refreshments and a cash bar. Sponsored by Pearson Education. Pacific J, Marriott.

**Mathematical Reviews Reception**, Friday, 6:00 p.m.- 7:00 p.m. All friends of *Mathematical Reviews* (*MR*) are invited to join reviewers and *MR* editors and staff (past and present) for a reception in honor of all the efforts that go into the creation and publication of the *Mathematical Reviews* database. Refreshments will be served. Foothills G, Marriott.

**Mathematical Institutes Open House**, Wednesday, 5:30 p.m.-8:00 p.m. Participants are warmly invited to attend this open house cosponsored by several North American mathematical institutes. Come find out about the latest activities and programs at each of the institutes that may be suited to your own research interests. Room 3022, Moscone West.

**MER Banquet**: The Mathematicians and Education Reform (MER) Forum welcomes all mathematicians who are interested in precollege, undergraduate, and/or graduate educational reform to attend the MER banquet on Thursday evening. This is an opportunity to make or renew contacts with other mathematicians who are involved in education projects and to engage in lively conversation about educational issues. The after-dinner discussion is an open forum for participants to voice their impressions, observations, and analyses of the current education scene. There will be a cash bar beginning at 6:30 p.m. Dinner will be served at 7:30 p.m. Tickets are US\$53 each, including tax and gratuity. Foothills G, Marriott.

**University of Michigan Alumni and Friends Reception**, Friday, 5:30 p.m.-7:00 p.m. Pacific C, Marriott.

**NAM Banquet**, Friday, 6:00 p.m.-8:40 p.m. The National Association of Mathematicians will host a banquet on Friday evening. A cash bar reception will be held at 6:00 p.m., and dinner will be served at 6:30 p.m. Tickets are US\$53 each, including tax and gratuity. Club Room, Marriott.

**NSA Women in Mathematics Society Networking Session**, Thursday, 6:00 p.m.-8:00 p.m. All participants are welcome to this annual event. Please stop by the NSA booth in the exhibit hall for the exact location.

**New Mexico State University Mathematics Association Reception**, Thursday, 6:00 p.m.-7:30 p.m. Current and former students and faculty as well as other friends of the New Mexico State University Department of Mathematical Sciences are cordially invited to this reception. Pacific F, Marriott.

**North Carolina State University Department of Mathematics Reception for Alumni and Friends**, Thursday, 6:00 p.m.-8:00 p.m. All alumni, friends, and participants in North Carolina State University programs (e.g., REU, REU+k, REG, IMSM, RTG) are invited to attend and meet old friends and to hear recent events in the Department of Mathematics. Hors d'oeuvres and drinks will be provided. See [www.math.ncsu.edu](http://www.math.ncsu.edu) or contact Hien Tran, [tran@math.ncsu.edu](mailto:tran@math.ncsu.edu) for more information. Foothills H, Marriott.

**Ohio State University Alumni and Friends Reception**, Friday, 6:00 p.m.-8:00 p.m. Pacific B, Marriott.

**University of Oregon Mathematics Department Reception**, Thursday, 6:30 p.m.-7:30 p.m. All alumni and friends are welcome. Pacific B, Marriott.

**Student Hospitality Center**, Wednesday-Friday, 9:00 a.m.-5:00 p.m., and Saturday, 9:00 a.m.-3:00 p.m., organized by **Richard and Araceli Neal**, American Society for the Communication of Mathematics. Located in the South Lobby, 2nd floor, Moscone West.

**Reception for Undergraduates**, Wednesday, 4:00 p.m.-5:00 p.m. Student Hospitality Center.

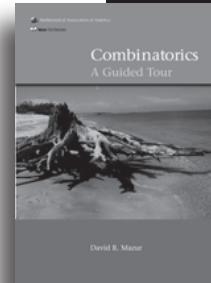
**University of Wisconsin-Madison Reception for Alumni and Friends**, Thursday, 5:45 p.m.-7:30 p.m. Please come and visit with old and new friends. Foothills F, Marriott.

# MAA Publications

Stop by the MAA Publications Booths for book signings with these new authors!

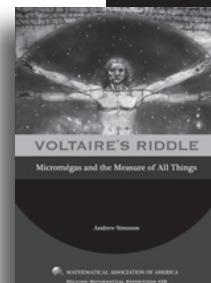
**Wednesday, January 13th, 3:30 P.M.**

David Mazur signing of  
*Combinatorics: A Guided Tour*



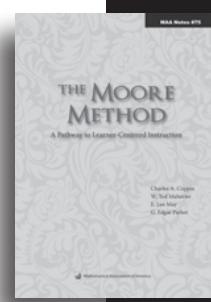
**Thursday, January 14th, 4:30 P.M.**

Andrew Simoson signing of  
*Voltaire's Riddle: Micromégas and the Measure of All Things*



**Friday, January 15th, 3:00 P.M.**

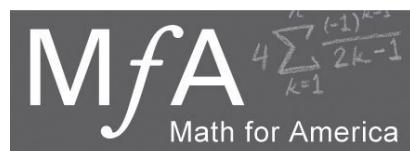
W. Ted Mahavier, E. Lee May, &  
G. Edgar Parker signing of  
*The Moore Method: A Pathway to Learner-Centered Instruction*



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## Social Program at a Glance

This document provides a thumbnail sketch of all scientific and social events so you can easily see which events may overlap and better plan your time.

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### Wednesday, January 13

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|----------------------|---|
| 5:30 p.m.-6:30 p.m.  | <b>RECEPTION FOR GRADUATE STUDENTS AND FIRST-TIME PARTICIPANTS</b> , Atrium, Marriott San Francisco |
| 5:30 p.m.-8:00 p.m.  | <b>MATHEMATICAL INSTITUTES OPEN HOUSE</b> , Room 3022, 3rd Floor, Moscone                           |
| 9:30 p.m.-11:00 p.m. | <b>AWM RECEPTION</b> , Atrium, Marriott San Francisco   |

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### Thursday, January 14

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|---------------------|---|
| 5:30 p.m.-6:30 p.m. | <b>JOINT PRIZE SESSION RECEPTION</b> , Room 2006, 2nd Floor, Moscone  |
| 5:45 p.m.-7:30 p.m. | <b>MAA TWO-YEAR COLLEGE RECEPTION</b> , Pacific J, Marriott San Francisco   |
| 5:45 p.m.-7:30 p.m. | <b>UNIVERSITY OF WISCONSIN-MADISON RECEPTION FOR ALUMNI AND FRIENDS</b> , Foothill F, Marriott San Francisco                                  |
| 6:00 p.m.-7:00 p.m. | <b>UNIVERSITY OF CHICAGO MATHEMATICS ALUMNI RECEPTION</b> , Pacific C, Marriott San Francisco   |
| 6:00 p.m.-8:00 p.m. | <b>CLAREMONT COLLEGES ALUMNI RECEPTION</b> , Pacific A, Marriott San Francisco  |
| 6:00 p.m.-7:30 p.m. | <b>THE GEORGE WASHINGTON UNIVERSITY DEPARTMENT OF MATHEMATICS RECEPTION</b> , Pacific E, Marriott San Francisco                               |
| 6:00 p.m.-7:30 p.m. | <b>ASSOCIATION OF LESBIAN, GAY, BISEXUAL AND TRANSGENDERED MATHEMATICIANS RECEPTION</b> , Foothill D, Marriott San Francisco                  |
| 6:00 p.m.-8:00 p.m. | <b>RECEPTION FOR ALUMNI AND FRIENDS OF THE NORTH CAROLINA STATE UNIVERSITY DEPARTMENT OF MATHEMATICS</b> , Foothill H, Marriott San Francisco |
| 6:00 p.m.-7:30 p.m. | <b>NEW MEXICO STATE UNIVERSITY RECEPTION</b> , Pacific F, Marriott San Francisco  |



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## **Program at a Glance – Thursday, January 13**

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- 6:00 p.m.–7:00 p.m. **7CITY LEARNING INFORMATION SESSION** *If you have an interest in financial markets, come to this Certificate in Quantitative finance (CQF) informal information session., Pacific H, Marriott San Francisco*
- 6:30 p.m.–9:00 p.m. **MER BANQUET**, Foothill G, Marriott San Francisco
- 6:30 p.m.–7:30 p.m. **UNIVERSITY OF OREGON MATHEMATICS DEPARTMENT RECEPTION FOR ALUMNI AND FRIENDS**, Pacific B, Marriott San Francisco
- 7:15 p.m.–8:00 p.m. **SIGMAA ON BUSINESS, INDUSTRY, AND GOVERNMENT RECEPTION**, Room 3006, 3rd Floor, Moscone
- 8:15 p.m.–9:45 p.m. **KNITTING CIRCLE**, Pacific I, Marriott San Francisco
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## **Friday, January 15**

- 5:30 p.m.–7:30 p.m. **UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN DEPARTMENT OF MATHEMATICS ALUMNI RECEPTION**, Sierra H, Marriott San Francisco
- 5:30 p.m.–7:00 p.m. **UNIVERSITY OF MICHIGAN ALUMNI AND FRIENDS RECEPTION**, Pacific C, Marriott San Francisco
- 6:00 p.m.–10:00 p.m. **ASSOCIATION OF CHRISTIANS IN THE MATHEMATICAL SCIENCES BANQUET**, Grand Ballroom B&C, Intercontinental
- 6:00 p.m.–8:00 p.m. **BUDAPEST SEMESTERS IN MATHEMATICS REUNION**, Sierra K, Marriott San Francisco
- 6:00 p.m.–7:30 p.m. **ALUMNI AND FRIENDS OF BRIGHAM YOUNG UNIVERSITY MATHEMATICS RECEPTION**, Pacific F, Marriott San Francisco
- 6:00 p.m.–7:00 p.m. **AMS MATHEMATICAL REVIEWS RECEPTION**, Foothill G, Marriott San Francisco
- 6:00 p.m.–9:30 p.m. **NAM BANQUET**, Club Room, Marriott San Francisco
- 6:00 p.m.–8:00 p.m. **THE OHIO STATE UNIVERSITY FRIENDS AND ALUMNI RECEPTION**, Pacific B, Marriott San Francisco
- 8:30 p.m.–10:30 p.m. **MAA-PROJECT NExT RECEPTION** *All Project NExT Fellows, consultants, and other friends of Project NExT are invited., Atrium, Marriott San Francisco*
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## **Saturday, January 16**

- 5:00 p.m.–6:15 p.m. **RECEPTION IN HONOR OF RETIRING MAA SECRETARY MARTHA SIEGEL**, Foothill G, Marriott San Francisco
- 6:30 p.m.–7:30 p.m. **AMS BANQUET RECEPTION**, Club Room, Marriott San Francisco
- 7:30 p.m.–10:00 p.m. **AMS BANQUET**, Atrium, Marriott San Francisco

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## *Notes*

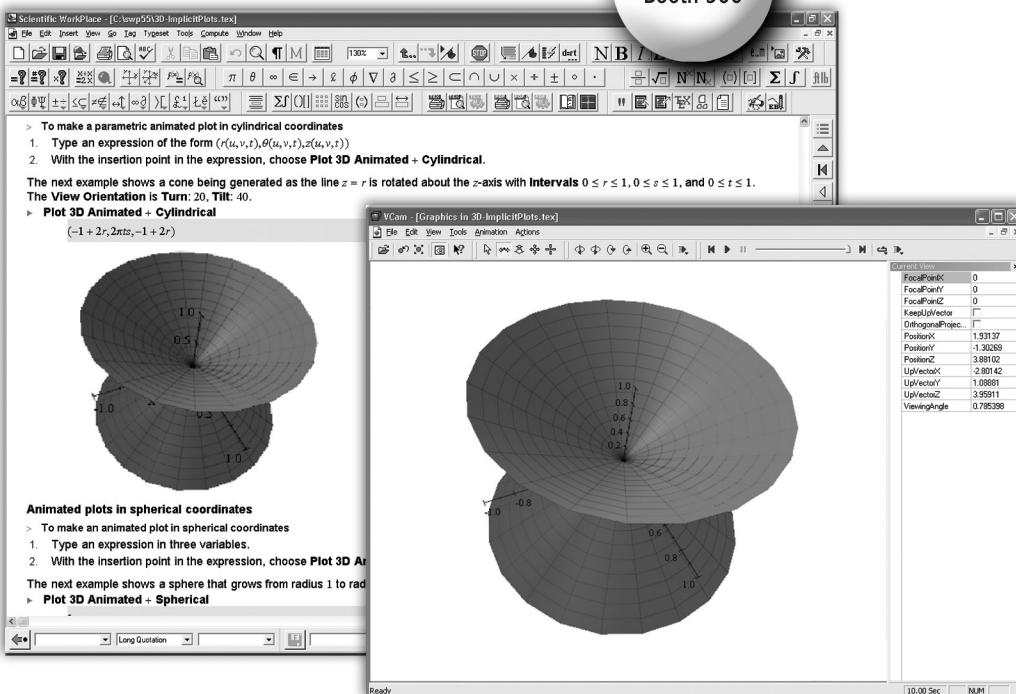
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