



Washington State Convention Center, Seattle, WA

Section Contents

JMM 2022 Announcement	1640
JMM 2022 Program Timetable	1663
AMS Employment Center.....	1679

Please note: The times listed herein were current as of press time. For the most up to date JMM 2022 scheduling information, please see: http://jointmathematicsm meetings.org/2268_timetable.html.

Welcome to JMM 2022. Reimagined by 13 (and counting!) partners, this largest annual mathematics gathering in the world offers you a broad range of presentations, panels, exhibits, and minicourses on research, pedagogy, inclusion, career opportunities, and more.

JMM 2022 features new organizations, disciplines, participants, and programming. Expect to learn, network, and build relationships through sessions, posters, professional development, social gatherings, and other opportunities.

Scientific exploration and discovery remain at the heart of JMM 2022. Leaf through the robust offerings on the following pages to find how JMM partners (listed below) have poured their collective energy into this reimagined gathering.

Prepare to come together to connect and collaborate. At JMM 2022, we will learn from each other. We will see old friends, and we will make new ones.

Stay tuned for JMM updates via social media and <https://jointmathematicsm meetings.org>. We can't wait to see you January 5–8 in Seattle.

Best regards,



Boris Hasselblatt, *Secretary of the AMS*

As of press time, these are the 13 organizations that have joined forces to organize the JMM:

- American Mathematical Society
- American Statistical Association
- Association for Symbolic Logic
- Association for Women in Mathematics
- Consortium for Mathematics and its Applications
- International Linear Algebra Society
- Julia Robinson Mathematics Festival
- Mathematical Sciences Research Institute
- National Association of Mathematicians
- Pi Mu Epsilon
- Society for Industrial and Applied Mathematics
- Spectra: Association for LGBT Mathematicians
- Transforming Post-Secondary Education in Mathematics

Seattle, Washington

Washington State Convention Center and the Sheraton Grand Seattle Hotel

January 5–8, 2022

Wednesday – Saturday

Meeting #1174

This meeting includes the annual meetings of the AMS, Association for Women in Mathematics (AWM), and National Association of Mathematicians (NAM), winter meeting of Association for Symbolic Logic (ASL), and sessions/events by them and Society for Industrial and Applied Mathematics (SIAM), American Statistical Association (ASA), Consortium for Mathematics and its Applications (COMAP), International

Linear Algebra Society (ILAS), Julia Robinson Mathematics Festival (JRMF), Mathematical Sciences Research Institute (MSRI), Spectra, and Transforming Post-Secondary Education in Mathematics (TPSE).

Associate Secretary for the AMS Scientific Program: Georgia Benkart, University of Wisconsin-Madison
Program first available on AMS website: November 2021

Deadlines

For organizers: Expired

For abstracts: September 21, 2021

The scientific information listed below may be dated. For the latest information, see https://www.jointmathematicsm meetings.org/meetings/national/jmm2022/2268_program.html.

Joint Invited Addresses

Marianna Csörnyei, University of Chicago, *The Kakeya needle problem for rectifiable sets* (AWM-AMS Noether Lecture).

Dave Kung, Charles A. Dana Center, The University of Texas at Austin, *Title to be announced* (MAA-SIAM-AMS Hrabowski-Gates-Tapia-McBay Lecture).

Kavita Ramanan, Brown University, *Title to be announced* (AAAS-AMS Invited Address).

Lauren K Williams, Harvard University, *Title to be announced* (MAA-AMS-SIAM Gerald and Judith Porter Public Lecture).

Talithia Williams, Harvey Mudd College, *Title to be announced* (JPBM Communications Award Lecture).

AMS Invited Addresses

Anna Gilbert, Yale University, *Title to be announced* (von Neumann Lecture).

Tyler J. Jarvis, Brigham Young University, *Title to be announced* (AMS Lecture on Education).

Daniel Reuben Krashen, Rutgers University, *Title to be announced*.

Dan Margalit, Georgia Institute of Technology, *Mixing surfaces, algebra, and geometry* (AMS Maryam Mirzakhani Lecture).

Gaston Mandata N'Guerekata, Morgan State University, *An invitation to periodicity*.

Hee Oh, Yale University, *Euclidean lines on hyperbolic manifolds* (AMS Erdős Memorial Lecture).

Jill Pipher, Brown University, *Title to be announced* (AMS Retiring Presidential Address).

Karen Smith, University of Michigan, *Title to be announced* (AMS Colloquium Lectures: Lecture I).

Karen Smith, University of Michigan, *Title to be announced* (AMS Colloquium Lectures: Lecture II).

Karen Smith, University of Michigan, *Title to be announced* (AMS Colloquium Lectures: Lecture III).

Eitan Tadmor, University of Maryland, *Emergent behavior in collective dynamics* (AMS Josiah Willard Gibbs Lecture).

Invited Addresses of Other JMM Partners

Jeremy Avigad, Carnegie Mellon University, *The Promise of Formal Mathematics* (ASL Invited Address).

Omer Ben-Neria, Einstein Institute of Mathematics, Jerusalem, *Diamonds compactness and ultrafilters in set theory* (ASL Invited Address).

Robert Q. Berry, III, University of Virginia, *Interest Convergence: An analytical viewpoint for examining how power dictates policies and reforms in mathematics* (NAM Cox-Talbot Address).

Peter Cholak, University of Notre Dame, *Ramsey like Theorems on the Rationals* (ASL Invited Address).

Pauline van den Driessche, University of Victoria, B.C., Canada, *Sign Patterns Meet Dynamical Systems* (ILAS Invited Address).

Qiang Du, Columbia University, *Analysis and Applications of Nonlocal Models* (SIAM Invited Address).

Monica Jackson, American University, *Spatial Data Analysis for Public Health Data* (NAM Claytor-Woodard Lecture).

Franziska Jahnke, University of Münster, *Decidability and definability in unramified henselian valued fields* (ASL Invited Address).

Xihong Lin, Harvard University, Broad Institute of MIT and Harvard, *Learning from COVID-19 Data on Transmission, Health Outcomes, Interventions and Vaccination* (ASA Committee of Presidents of Statistical Societies Lecture).

Sandra Müller, Technical University of Vienna, *Lower Bounds in Set Theory* (ASL Invited Address).

Lynn Scow, California State San Bernardino, *Semi-retractions and the Ramsey Property* (ASL Invited Address).

Erik Walsberg, University of California Irvine, *Model theory of large fields* (ASL Invited Address).

Invited Addresses of Other Organizations

Nicolas Fillion, Simon Fraser University, *Trust but Verify: What can we know about the reliability of a computer-generated result?* (SIGMAA Guest Speaker).

Edray Herber Goins, Pomona College, *Addressing Anti-Black Racism in Our Departments* (Project NExT Lecture on Teaching and Learning).

Heather Price, North Seattle College, *Climate Justice Integrated Learning in STEM* (SIGMAA Guest Speaker).

Adrian Rice, Randolph-Macon College, *Beyond the strength of a woman's physical power: Mathematics, machines, and the mind of Ada Lovelace* (SIGMAA Guest Speaker).

Joint Prize Session

Join the JMM 2022 Partners in celebrating the achievements of a selection of their prize and award winners at 4:25 pm on Wednesday. All participants are invited and encouraged to attend.

Special Sessions of the JMM

If you are volunteering to speak in a Special Session, you should submit your abstract as early as possible via the abstract submission form found at <https://jointmathematicsm meetings.org/meetings/abstracts/abstract.pl?type=jmm>.

AMS Special Sessions

Abraham Robinson's Nonstandard Methods in Mathematics and Its Applications (Code: SS 59A), **Matt Insall**, Missouri University of Science and Technology, **Peter Loeb**, University of Illinois at Urbana-Champaign, and **Malgorzata Marciniak**, City University of New York.

Advances in Coding Theory (Code: SS 123A), **Katie Haymaker**, Villanova University, **Hiram Lopez**, Cleveland State University, and **Beth Malmskog**, Colorado College.

Advances in Operator Algebras (Code: SS 104A), **Rolando de Santiago**, Purdue University, **Adam Fuller**, Ohio University, **Lara Ismert**, Embry-Riddle Aeronautical University, and **Pieter Spaas**, University of California, Los Angeles.

Advancing Data Privacy-Preserving Methodologies (Code: SS 43A), **Claire Bowen**, Urban Institute.

Algebraic and Bijective Methods in Permutation Enumeration (Code: SS 58A), **Sergi Elizalde**, Dartmouth College, **Bridget Tenner**, DePaul University, and **Justin Troyka** and **Yan Zhuang**, Davidson College.

A Match Made in the Stacks: Mathematician and Librarian Collaborations (Code: SS 52A), **Anya Bartekmann**, Princeton University, and **Samuel Hansen**, University of Michigan.

Analysis and Applications of Fractional Stochastic and Dynamic Systems (Code: SS 7A), **John Graef**, University of Tennessee at Chattanooga, **Gangaram Ladde**, University of South Florida, and **Aghalaya Vatsala**, University of Louisiana at Lafayette.

Analysis and Differential Equations at Undergraduate Institutions (Code: SS 71A), **John Ross**, Southwestern University, **Mihai Stoiciu**, Williams College, and **Scott Zimmerman**, The Ohio State University at Marion.

Analysis in Metric Spaces (a Mathematics Research Communities Session) (Code: SS 137A), **Chris Gartland**, Texas A & M University, **Silvia Ghinassi**, University of Washington, **Ilmari Kangasniemi**, Syracuse University, and **Ryan Alvarado**, Amherst College.

Analysis of and Recent Advances in Difference, Differential and Dynamic Equations with Applications (Code: SS 98A), **Raegan Higgins** and **Ozkan Ozturk**, Texas Tech University.

Applications of Mathematical Models and Dynamical Systems in Biology (Code: SS 39A), **Yang Li**, University of Cincinnati, **Hongying Shu**, Shaanxi Normal University, and **Xiang-Sheng Wang**, University of Louisiana at Lafayette.

Applied Combinatorial Methods (Code: SS 87A), **Sinan Aksoy**, Pacific Northwest National Laboratory, **Bill Kay**, Oak Ridge National Laboratory, and **Stephen Young**, Pacific Northwest National Laboratory.

A Showcase of Number Theory at Undergraduate Institutions (Code: SS 26A), **Ricardo Conceicao**, Gettysburg College, **Lindsay Dever**, Bryn Mawr College, and **Eva Goedhart**, Williams College.

Asymptotic Behavior of Evolution Equations (Code: SS 76A), **Jin Liang**, Shanghai Jiao Tong University, **Nguyen Minh**, University of Arkansas Little Rock, **Gaston N'Guerekata**, Morgan State University, and **Ti-Jun Xiao**, Fudan University.

Bifurcations of Difference Equations and Discrete-time Competitive and Cooperative Population Models (Code: SS 14A), **Arzu Bilgin**, Recep Tayyip Erdogan University, and **Toufik Khyat**, Texas Tech University.

Collaborative Undergraduate Research: Experiences with CURM (Code: SS 64A), **Kathryn Leonard**, Occidental College.

Combinatorial Applications of Computational Geometry and Algebraic Topology (a Mathematics Research Communities Session) (Code: SS 135A), **Stephen Gillen**, University of Pennsylvania, and **Sam Simon**, Simon Fraser University.

Combinatorial Approaches to Topological Structures and Applications (Code: SS 113A), **Emilie Purvine** and **Cliff Joslyn**, Pacific Northwest National Laboratory.

Commutative Algebra (Code: SS 28A), **Eloisa Grifo**, University of Nebraska-Lincoln, **Keri Sather-Wagstaff**, Clemson University, and **Janet Vassilev**, University of New Mexico.

Competing Foundations for Mathematics: How Do We Choose? (Code: SS 6A), **Bonnie Gold**, Monmouth University.

Complex Adaptive Systems and Evolutionary Models in Biology and Psychology (Code: SS 121A), **Jun Chen**, **Yun Kang**, **M. Gabriela Navas-Zuloaga**, and **Lucero Rodriguez**, Arizona State University.

Creative Teaching Methods That Can Lead to Student Learning (Code: SS 4A), **Ellina Grigorieva**, Texas Woman's University, and **Michael Radin**, Rochester Institute of Technology.

Current Advances in Computational Biomedicine (Code: SS 3A), **Heiko Enderling**, H. Lee Moffitt Cancer Center & Research Institute, **Niels Halama**, German Cancer Research Center, **Viviana Risca**, Rockefeller University, and **Nek Valous**, National Center for Tumor Diseases.

Distance Problems in Continuous Discrete and Finite Field Settings (Code: SS 54A), **Abdul Basit**, Iowa State University, **Steven Miller**, Williams College, **Eyvindur Palsson** and **Sean Sovine**, Virginia Tech, and **Charles Wolf**, University of Rochester.

Dynamics of Infectious Diseases: Ecological Models Across Multiple Scales (a Mathematics Research Communities Session) (Code: SS 134A), **George Lytle**, University of Montevallo, and **Zhuolin Qu**, University of Texas, San Antonio.

Early Career Number Theory Research with Combinatorics, Modular Forms, and Basic Hypergeometric Series (Code: SS 38A), **Christopher Jennings-Shaffer**, University of Denver, and **Ali Uncu**, University of Bath.

Engaging Students Through Modeling Hands-on Projects and Innovative Exploratory Approaches (Code: SS 122A), **Rachel Grotheer**, Wofford College, **Joel Kitty**, Centre College, **Alison Marr**, Southwestern University, **Alex McAllister**, Centre College, and **Stephen Walk**, St. Cloud State University.

Evolution Equations and Their Asymptotic Behavior (Code: SS 105A), **Gisele Mophou**, Universite des Antilles en Guadeloupe, **Gaston N'Guerekata**, Morgan State University, and **Mahamadi Warma**, George Mason University.

Explicit Methods for Modularity (Code: SS 117A), **Eran Assaf**, Dartmouth, **Edgar Costa**, Massachusetts Institute of Technology, **Brendan Hassett**, Brown University, and **David Roe**, Massachusetts Institute of Technology (Sponsored by Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation).

Finding Needles in Haystacks: Approaches to Inverse Problems Using Combinatorics and Linear Algebra (a Mathematics Research Communities Session) (Code: SS 136A), **Shahla Nasserar**, Rochester Institute of Technology, **Emily Olson**, Millikin University, and **Sam Spiro**, University of California San Diego.

Fusion Categories and Their Applications in Physics (Code: SS 41A), **Colleen Delaney**, Indiana University, and **Corey Jones**, North Carolina State University.

Geometric and Topological Combinatorics (Code: SS 102A), **Anton Dochtermann**, Texas State University, **Bennet Goeckner** and **Gaku Liu**, University of Washington, and **Steven Klee**, Seattle University.

Geometric Group Theory-AMS Mirzakhani (Code: SS 133A), **Carolyn Abbott**, Brandeis University, **Mladen Bestvina**, University of Utah, and **Dan Margalit**, Georgia Tech University.

Geometric Measure Theory (Code: SS 44A), **Theodora Bourni** and **Vyron Vellis**, University of Tennessee, Knoxville.

Geometry in the Mathematics of Data Science (Code: SS 127A), **Tim Doster**, **Tegan Emerson**, and **Henry Kvinge**, Pacific Northwest National Laboratory.

Heat Content Exit Time and Geometric Analysis (Code: SS 89A), **Patrick McDonald**, New College of Florida, and **Jeffrey Langford**, Bucknell University.

History of Mathematics (Code: SS 86A), **Sloan Despeaux**, Western Carolina University, **Deborah Kent**, University of St. Andrews, **Jemma Lorenat**, Pitzer College, and **Daniel Otero**, Xavier University.

Hopf Algebras and Tensor Categories (Code: SS 55A), **Siu-Hung Ng**, Louisiana State University, **Julia Plavnik**, Indiana University, and **Henry Tucker**, University of California, Riverside.

If You Build It They Will Come: Presentations by Scholars in the National Alliance for Doctoral Studies in the Mathematical Sciences (Code: SS 57A), **David Goldberg**, Purdue University, and **Phil Kutzko**, University of Iowa.

Innovative and Elective Ways to Teach Linear Algebra (Code: SS 1A), **Sepideh Stewart**, University of Oklahoma, **Gil Strang**, Massachusetts Institute of Technology, **David Strong**, Pepperdine University, and **Megan Wawro**, Virginia Tech.

Inquiry-based Teaching and Learning (Code: SS 82A), **Volker Ecke**, Westfield State University, **Parker Glynn-Adey**, University of Toronto at Scarborough, **Mel Henriksen**, Wentworth Institute of Technology, **Nathaniel Miller**, University of Northern Colorado, **Lee Roberson**, University of Colorado-Boulder, **Christine von Renesse**, Westfield State University, **Mami Wentworth**, Wentworth Institute of Technology, and **Nina White**, University of Michigan.

Intersections of Geometric Analysis and Mathematical Physics (Code: SS 106A), **Xianzhe Dai** and **A'kos Nagy**, University of California, Santa Barbara.

Knots, Links, 3-manifolds, ... and 4-manifolds (Code: SS 114A), **Christopher Davis**, University of Wisconsin, **Shelly Harvey**, Rice University, and **Carolyn Otto**, University of Wisconsin Eau Claire.

Knot Theory in Dimension Four (Code: SS 19A), **Jeffrey Meier**, Western Washington University, **Maggie Miller**, Stanford University, and **Patrick Naylor**, Princeton University.

Latinxs in Combinatorics (Code: SS 47A), **Laura Escobar**, Washington University in St. Louis, **Pamela E. Harris**, Williams College, and **Andres R. Vindas Melendez**, MSRI & UC Berkeley.

Little School Dynamics: Cool Research at Primarily Undergraduate Institutions (Code: SS 85A), **Kimberly Ayers**, Carroll College, **Han Li**, Wesleyan University, **David McClendon**, Ferris State University, **Andy Parrish**, Eastern Illinois University, and **Ami Radunskaya**, Pomona College.

Low-dimensional Manifolds (Code: SS 66A), **Catherine Pfaff**, Queen's University, **Rachel Roberts**, Washington University in St. Louis, and **Jennifer Schultens**, University of California, Davis.

Math Circle Outreach Activities that Engage Diverse Audiences (Code: SS 12A), **Lauren Rose**, Bard College, and **James Taylor**, Math Circles Collaborative of New Mexico.

Mathematical and Conceptual Foundations of Physics (Code: SS 103A), **David Weisbart**, University of California Riverside, and **Adam Yassine**, The American University in Cairo.

Mathematical Knowledge for Teaching High School and College Calculus Courses (Code: SS 118A), **James Madden**, Louisiana State University, **Carl Olimb**, Augustana University, and **Jennifer Whitfield**, Texas A&M University (Sponsored by SIGMAA on Mathematical Knowledge for Teaching).

Mathematical Modeling of Biological Processes (Code: SS 126A), **Dawit Denu**, Georgia Southern University, **Sedar Ngoma**, SUNY Geneseo, and **Rachidi Salako**, The Ohio State University.

Mathematical Modeling of Population Dynamics Across Scales: From Immuno-epidemiology to Multilevel Selection (Code: SS 91A), **Daniel Cooney**, University of Pennsylvania, and **Chadi Saad-Roy**, Princeton University.

Mathematical Models for Biomolecular and Cellular Interactions (Code: SS 75A), **Daniel Cruz**, Georgia Institute of Technology, and **Margherita Ferrari**, University of South Florida.

Mathematical Models of Diseases: Analysis and Computation (Code: SS 35A), **Xuming Xie** and **Najat Ziyadi**, Morgan State University.

Mathematical Tools for Computer Vision Problems (Code: SS 116A), **Anna Grim**, Brown University, **Patricia Medina**, Yeshiva College, and **Marilyn Vazquez**, Ohio State University.

Mathematics and New Media (Code: SS 99A), **Mohamed Omar**, Harvey Mudd College, and **Michael Penn**, Randolph College.

Mathematics and Sports (Code: SS 112A), **Russell Goodman**, Central College, and **Hope McIlwain**, Mercer University.

Mathematics and the Arts (Code: SS 100A), **Karl Kattchee**, University of Wisconsin-La Crosse, **Doug Norton**, Villanova University, and **Anil Venkatesh**, Adelphi University.

Mathematics of Algorithms in Industry (Code: SS 83A), **Tyler Jarvis**, Brigham Young University, and **Jeffrey Humphreys**, University of Utah.

Mathematics Through the Informational Lens (Code: SS 109A), **Chid Apte**, **Rachel Bellamy**, **Charles Bennett**, **Kenneth Clarkson**, **John Cohn**, **Payel Das**, **Lior Horesh**, **Jon Lenchner**, **JR Rao**, **John Smolin**, **Mark Squillante**, **Yuhai Tu**, and **Chai Wu**, IBM Research.

Modular Forms and Combinatorics (Code: SS 107A), **Madeline Dawsey**, University of Texas at Tyler, **Larry Rolen**, Vanderbilt University, **Robert Schneider**, University of Georgia, and **Ian Wagner**, Vanderbilt University.

New Problems in Several Complex Variables (a Mathematics Research Communities Session) (Code: SS 138A), **Sean Curry**, Oklahoma State University, **Zhenghui Huo**, University of Toledo, **Valentin Kunz**, University of Manchester, and **Palencia Infante**, Northern Illinois University.

Noncommutative Algebra and Noncommutative Invariant Theory (Code: SS 29A), **Ellen Kirkman**, Wake Forest University, and **Robert Won** and **James Zhang**, University of Washington.

Nonlinear Evolution Equations Stability and Long Time Behavior of Solutions (Code: SS 42A), **Ezzinbi Khalil**, and **Gaston N'Guerekata**, Morgan State University.

Number Theory at Non-PhD Granting Institutions (Code: SS 62A), **Harris Daniels**, Amherst College, **Alia Hamieh**, University of Northern British Columbia, **Steven Miller**, Williams College, **Naomi Tanabe**, Bowdoin College, and **Enrique Trevino**, Lake Forest College.

Numerical Methods and Deep Learning for PDEs (Code: SS 34A), **Wei Guo** and **Chunmei Wang**, Texas Tech University.

Partial Differential Equations and Complex Variables (Code: SS 108A), **Hyunkyung Kwon**, University at Albany, and **Bingyuan Liu**, The University of Texas Rio Grande Valley.

Partition Theory and Related Topics (Code: SS 46A), **Dennis Eichhorn**, University of California, Irvine, **William Keith**, Michigan Technological University, and **Brandt Kronholm**, University of Texas, Rio Grande Valley.

Perfectoid Spaces (Code: SS 40A), **Shanna Dobson**, California State University, Los Angeles.

Piecewise & Discontinuous Difference Equations & Applications (Code: SS 9A), **Vlajko Kocic**, Xavier University in Louisiana, and **Michael Radin**, Rochester Institute of Technology.

Polymath Jr: Mentoring and Learning (Code: SS 30A), **Kira Adaricheva**, Hofstra University, **Zhanar Berikkyzy**, Fairfield University, **Johanna Franklin**, Hofstra University, **Seoyoung Kim**, Queens University, **Steven Miller**, Williams College, **Adam Sheffer**, Baruch College, and **Yunus Zeytuncu**, University of Michigan-Dearborn.

Presenting Research Mathematics Through Visual Storytelling: Slides Without Words and Equations (Code: SS 36A), **Henry Adams**, **Justin O'Connor**, **Kyle Salois**, **Brittany Story**, and **Ciera Street**, Colorado State University.

Programs that Support Student Research - SIGMAA on Undergraduate Research (Code: SS 51A), **Allison Henrich**, Seattle University, **Kate Kearney**, Gonzaga University, and **Nicolas Scoville**, Ursinus College.

Quadratic Forms, Theta Functions and Modularity (Code: SS 81A), **Allison Arnold-Roksandich**, United States Department of Defense, **Gene Kopp**, Purdue University, and **Kate Thompson**, United States Naval Academy.

Quantitative Literacy and Society (Code: SS 79A), **Mark Branson**, Stevenson University, **Catherine Crockett**, Point Loma Nazarene University, **Gizem Karaali**, Pomona College, **Kathryn Knowles**, Texas A&M-San Antonio, and **Samuel Tunstall**, Trinity University, San Antonio TX.

Quantization for Probability Distributions and Dynamical Systems (Code: SS 56A), **Sangita Jha**, National Institute of Technology, **Mrinal Roychowdhury**, University of Texas Rio Grande Valley, and **Saurabh Verma**, Indian Institute of Information Technology.

Quantum Categorical Structures in Mirror Symmetry (Code: SS 110A), **Nathaniel Bottman**, Max Planck Institute for Mathematics, **Sheel Ganatra**, University of Southern California, **Alexei Oblomkov**, University of Massachusetts, Amherst, and **Abigail Ward**, Massachusetts Institute of Technology.

Quaternions (Code: SS 67A), **Terrence Blackman**, Medgar Evers College - City University of New York, and **Johannes Familton** and **Chris McCarthy**, Borough of Manhattan Community College - City University of New York.

Random Matrix Theory and its Applications (Code: SS 22A), **Kyle Luh** and **Sean O'Rourke**, University of Colorado Boulder, and **Tom Trogdon**, University of Washington.

Random Polynomials and Related Models (Code: SS 130A), **Sean O'Rourke**, University of Colorado Boulder, and **Noah Williams**, Appalachian State University.

Reaction Diffusion Models with Applications in Spatial Ecology (Code: SS 92A), **Jerome Goddard III**, Auburn University Montgomery, and **Ratnasingham Shivaji**, University of North Carolina Greensboro.

Real World Applications of Mathematics (Code: SS 94A), **Vinodh Chellamuthu**, Dixie State University, and **Darren Narayan**, Rochester Institute of Technology.

Recent Advances in Fluids and Related Models (Code: SS 24A), **Theodore Drivas**, Stony Brook, **Hussain Ibdah**, Texas A&M, and **Huy Nguyen**, University of Maryland.

Recent Advances in Mathematical Biology Ecology and Epidemiology (Code: SS 65A), **Lale Asik**, University of the Incarnate Word, and **Ummugul Bulut**, Texas A&M University San Antonio.

Recent Advances in Packing (Code: SS 50A), **Joseph Iverson**, Iowa State University, **John Jasper**, South Dakota State University, and **Dustin Mixon**, The Ohio State University.

Recent Developments in Nonlocal Modeling and Analysis (Code: SS 78A), **James Scott**, University of Pittsburgh, **Tadele Mengesha**, University of Tennessee, and **Xiaochuan Tian**, University of California, San Diego.

Recent Progress in Function Theory and Operator Theory (Code: SS 17A), **Alberto Condori**, Florida Gulf Coast University, **Elodie Pozzi**, St Louis University, **William Ross**, University of Richmond, and **Alan Sola**, Stockholm University.

Research in Mathematics by Undergraduates and Students in Post-baccalaureate Programs (Code: SS 18A), **Darren Narayan**, Rochester Institute of Technology (AMS-SIAM).

Rethinking Number Theory (Code: SS 97A), **Heidi Goodson**, Brooklyn College City University of New York, **Allechar Serrano Lopez**, Harvard University, **Christelle Vincent**, University of Vermont, and **McKenzie West**, University of Wisconsin-Eau Claire.

Scalar Curvature and Convergence (Code: SS 10A), **Brian Allen**, University of Hartford, **Lan-Hsuan Huang**, University of Connecticut, and **Raquel Perales**, Universidad Nacional Autonoma de Mexico.

Scholarship of Teaching and Learning: Past, Present and Future (Code: SS 53A), **Thomas Banchoff**, Brown University, **Curtis Bennett**, California State University, Long Beach, **Jacqueline Dewar**, Loyola Marymount University, **Brian Katz**, California State University, Long Beach, **Lew Ludwig**, Denison University, and **Larissa Schroeder**, University of Nebraska, Omaha.

Several Complex Variables Geometric PDE and CR Geometry (Code: SS 73A), **Anne-Katrin Gallagher**, Gallagher Tool & Instrument, Redmond, WA, and **Bernhard Lamel** and **Nordine Mir**, Texas A&M University at Qatar.

Skein Theory and Quantum Algebra (Code: SS 77A), **Rhea Bakshi**, The George Washington University, **Wade Bloomquist**, Georgia Institute of Technology, and **Vijay Higgins**, University of California Santa Barbara.

Statistics and Machine Learning Using Topology and Geometry (Code: SS 63A), **Austin Lawson** and **Vasileios Maroulas**, University of Tennessee Knoxville, **Farzana Nasrin**, University of Hawaii at Manoa, and **Christopher Oballe**, University of Notre Dame.

Stochastic Models in Studying Biological Systems (Code: SS 120A), **Shusen Pu**, Vanderbilt University, and **Alexander Strang**, University of Chicago.

Structured Polynomial Systems In Mathematics and Its Applications (Code: SS 69A), **Taylor Brysiewicz**, Max Planck Institute for Mathematics in the Sciences, and **Frank Sottile**, Texas A&M University.

The EDGE (Enhancing Diversity in Graduate Education) Program: Pure and Applied Talks by Women Math Warriors (Code: SS 8A), **Ziva Myer**, Duke University, **Laurel Ohm**, Courant Institute, New York University, and **Shanise Walker**, University of Wisconsin-Eau Claire.

The Many Lives of Lattice Theory with an Emphasis on Distributive & Semi-distributive Lattices and Combinatorics (Code: SS 5A), **Zeinab Bandpey** and **Jonathan Farley**, Morgan State University.

The Mathematics of Decisions, Elections and Games (Code: SS 13A), **Michael Jones**, American Mathematical Society - Mathematical Reviews, **David McCune**, William Jewell College, and **Jennifer Wilson**, Eugene Lang College The New School.

The Mathematics of RNA and DNA (Code: SS 68A), **Johannes Familton** and **Chris McCarthy**, Borough of Manhattan Community College City University of New York.

The Teaching and Learning of Undergraduate Ordinary Differential Equations (Code: SS 84A), **Chris Goodrich**, The University of New South Wales, **Viktoria Savatorova**, Central Connecticut State University, **Itai Seggev**, Wolfram Research, and **Beverly West**, Cornell University.

Topics and Generalizations in Geometric Group Theory (Code: SS 95A), **John Bergschneider**, **Bikash Das**, and **Opal Graham**, University of North Georgia.

Topics in Extremal Combinatorics (Code: SS 115A), **Cory Palmer**, University of Montana, and **Amites Sarkar**, Western Washington University.

Transient Probabilities of Random Processes, Duality Theory and Gambler's Ruin Probabilities (Code: SS 90A), **Alan Krinik** and **Randall Swift**, Cal Poly Pomona.

Undergraduate Research Activities in Mathematical and Computational Biology (Code: SS 93A), **Timothy Comar**, Benedictine University, and **Hannah Highlander**, University of Portland.

Weave Reality into Your Differential Equations Course with Modeling (Code: SS 21A), **Vinodh Chellamuthu**, Dixie State University, **Rikki Wagstrom**, Metropolitan State University, **Tracy Weyand**, Rose-Hulman Institute of Technology, and **Brian Winkel**, SIMIODE.

American Association for the Advancement of Science Special Sessions

Stochastic Processes on Networks (Code: SS 132A), **Oanh Nguyen**, University of Illinois at Urbana-Champaign, and **Kavita Ramanan**, Brown University.

American Statistical Association Special Sessions

Statistical issues of COVID-19 Data (Code: SS 141A), **Xihong Lin**, Harvard University and Broad Institute of MIT.

Association for Symbolic Logic Special Sessions

Model-theoretic Classification Program (Code: SS 131A), **Artem Chernikov** and **Nicholas Ramsey**, University of California, Los Angeles.

Association for Women in Mathematics Special Sessions

Celebrating the Mathematical Contributions of the AWM (Code: SS 33A), **Donatella Danielli**, Arizona State University, **Kathryn Leonard**, Occidental College, **Michelle Manes**, University of Hawaii at Manoa, and **Ami Radunskaya**, Pomona College.

Mathematics in the Literary Arts and Pedagogy in Creative Settings (Code: SS 20A), **Shanna Dobson**, California State University, Los Angeles, and **Elizabeth Donovan**, Elizabeth Donovan.

Women and Gender Minorities in Symplectic and Contact Geometry and Topology (Code: SS 49A), **Orsola Capovilla-Searle**, Duke University, **Dahye Cho**, Stony Brook University, and **Angela Wu**, University of College, London.

Women in Computational Topology (Code: SS 96A), **Brittany Fasy**, Montana State University, and **Lori Ziegelmeier**, Macalester College.

Women in Geometry (Code: SS 37A), **Catherine Searle**, Wichita State University, **Elizabeth Stanhope**, Lewis and Clark University, and **Guofang Wei**, University of California, Santa Barbara.

Women in Mathematical Biology (Code: SS 111A), **Christina Edholm**, Scripps College, **Maryann Hohn**, Pomona College, **Amanda Laubmeier**, Texas Tech University, **Carrie Manore**, Los Alamos National Laboratory, and **Heather Zinn-Brooks**, Harvey Mudd College.

Women in Topology (Code: SS 80A), **Kristine Bauer**, University of Calgary, **Anna Marie Bohmann**, Vanderbilt University, **Angelica Osorno**, Reed College, **Carmen Rovi**, MPIM and University of Heidelberg, and **Sarah Yeakel**, University of California, Riverside.

Women of Color in Combinatorics (Code: SS 25A), **Zhanar Berikkyzy**, Fairfield University, and **Shanise Walker**, University of Wisconsin Eau Claire.

Consortium for Mathematics and its Applications Special Sessions

COMAP's Mathematical Modeling Contests: Sharing Experiences and Benefits (Code: SS 88A), **Amanda Beecher**, Ramapo College of New Jersey, **Steve Horton**, US Military Academy (Emeritus), and **Kathleen Snook**, COMAP.

International Linear Algebra Society Special Sessions

Matrix Analysis and Applications (Code: SS 16A), **Mohsen Aliabadi**, Iowa State University, and **Luyining Gan** and **Tin-Yau Tam**, University of Nevada, Reno.

Matrix Analysis and Applications I (Code: SS 15A), **Mohsen Aliabadi**, Iowa State University, and **Luyining Gan** and **Tin-Yan Tam**, University of Nevada, Reno.

The Interplay of Matrix Analysis and Operator Theory (Code: SS 23A), **Kelly Bickel**, Bucknell University, **Meredith Sargent**, University of Arkansas, **Ryan Tully-Doyle**, California Polytechnic, San Luis Obispo, and **Hugo Woerdeman**, Drexel University.

The Inverse Eigenvalue Problem for a Graph, Zero Forcing, Throttling and Related Topics (Code: SS 70A), **Mary Flagg**, University of St. Thomas, and **Hein Van der Holst**, Georgia State University.

Mathematical Sciences Research Institute Special Sessions

Combinatorial and Homological Methods in Commutative Algebra (Code: SS 32A), **Jennifer Biermann**, Hobart and William Smith Colleges, and **Selvi Kara**, University of Utah.

Frame Theory and Applications (Code: SS 31A), **Roza Aceska**, Ball State University, and **Yeon Kim**, Central Michigan University.

Lie Group Actions in Differential Geometry (Code: SS 61A), **Carolyn Gordon**, Dartmouth College, **Meera Mainkar**, Central Michigan University, **Tracy Payne**, Idaho State University, and **Cynthia Will**, University of Cordoba (Argentina).

Metric Geometry and Topology (Code: SS 60A), **Christine Escher**, Oregon State University, and **Catherine Searle**, Wichita State University.

Resistance Distance and Other Metrics on Graphs and Networks (Code: SS 48A), **Emily Evans**, Brigham Young University, and **Amanda Francis**, Mathematical Reviews, American Mathematical Society.

Tensor Modeling and Optimization (Code: SS 27A), **Anna Ma**, University of California, Irvine, **Deanna Needell**, University of California, Los Angeles, and **Jing Qin**, University of Kentucky.

The MSRI African Diaspora Joint Mathematics Workshop (ADJOINT) (Code: SS 139A), **Caleb Ashley**, Boston College, and **Edray Goins**, Pomona College.

The MSRI Undergraduate Program (Code: SS 140A), **Rebecca Garcia**, Sam Houston State University, and **Pamela E. Harris**, Williams College.

Society for Industrial and Applied Mathematics Minisymposium

Advances in Mathematical Biology (Code: SIAMMINI3A), **Shilpa Khatri**, **Roummel Marcia**, and **Erica Rutter**, University of California Merced.

Advancing Racial Equity in Applied Mathematics (Code: SIAMMINI7A), **Ron Buckmire**, Occidental College, and **P. Seshaiyer**, George Mason University.

Graduate Research in Industry and in National Laboratory Internships (Code: SIAMMINI5A), **Nicole Buczkowski** and **Hayley Olson**, University of Nebraska-Lincoln.

Lessons Learned: The Future of Online and Hybrid Modalities in Education and the Workplace (A SIAM ED session) (Code: SIAMMINI1A), **Manuchehr A. Aminian**, Cal Poly Pomona, and **Alvaro Ortiz**, Georgia Gwinnett College.

Mathematics of Complex Systems (Code: SIAMMINI6A), **Heather Zinn Brooks**, Harvey Mudd College, **Alexander P. Hoover**, University of Akron, **Mason A. Porter**, University of California Los Angeles, **Alice Schwarze**, University of Washington, and **Alexandria Volkening**, Northwestern University.

Nonlocal and Fractional Problems in Analysis and PDEs (Code: SIAMMINI8A), **Petronela Radu**, University of Nebraska-Lincoln.

Quantum Algorithms (Code: SIAMMINI4A), **Lin Lin**, University of California, Berkeley.

Sensitivity Analysis and Uncertainty Quantification for Scientific and Biological Models (Code: SIAMMINI2A), **Ralph Smith**, North Carolina State University.

AMS Sessions for Contributed Papers

There will be sessions of ten-minute contributed talks. Although an individual may present only one contributed paper at a meeting, any combination of joint authorship may be accepted, provided no individual speaks more than once on the contributed paper program. Contributed papers will be grouped together by related subject classifications into sessions.

Submission of Abstracts for JMM Sessions

Authors must submit abstracts of talks through the JMM abstract submission site.¹ Simply follow the step-by-step instructions through to completion, until you receive a confirmation of your successful submission. Detailed instructions are also posted on <https://jointmathematicsm meetings.org>. No submission is complete until you receive this confirmation. The deadline for all submissions is **September 21, 2021**. Late papers cannot be accommodated. Please email abs-coord@ams.org if you have questions.

Programs of JMM Partners

Please see complete descriptions of these sessions on the JMM website.

American Mathematical Society

AMS Poster Session

AMS - PME Student Poster Session, organized by **Chad Awtrey**, Samford University, **Paul Fishback**, Grand Valley State University, and **Eric Ruggieri**, College of the Holy Cross; Friday, 10:30 am–12:00 pm and 3:30–5:00 pm. These sessions feature research done by undergraduate students. First-year graduate students are eligible to present if their research was completed while they were still undergraduates. Research by high school students can be accepted if the research was conducted under the supervision of a faculty member at a post-secondary institution.

Appropriate content for a poster includes, but is not limited to, a new result, a new proof of a known result, a new mathematical model, an innovative solution to a Putnam problem, or a method of solution to an applied problem. Purely expository material is not appropriate for this session.

Participants should submit an abstract through the JMM abstract submission portal by **September 21**; notification of acceptance or rejection will be sent by approximately **October 12**. Questions regarding this session should be directed to **Chad Awtrey**, cawtrey@samford.edu, **Paul Fishback**, fishbacp@mail.gvsu.edu, or **Eric Ruggieri**, eruggier@holycross.edu.

AMS Panels

Please see complete descriptions of these sessions on the JMM website.

AMS Panel on Journal Publishing: Ethics and Best Practices, organized by **Lauren Foster**, American Mathematical Society, and **Nicola Poser**, American Mathematical Society; Wednesday, 9:30–10:30 am.

AMS Committee on Equity, Diversity, and Inclusion Panel: Transforming Higher Education to Achieve Equity, organized by **Sarah Greenwald** and **Jim Lewis**, AMS Committee on Equity, Diversity, and Inclusion; Wednesday, 10:30 am–12:00 pm. Please join this conversation, moderated by **Dr. Ron Buckmire**, the chair of the AMS Committee on Equity, Diversity, and Inclusion. Panelists are **Shirley Malcom**, Association for the Advancement of Science and SEA Change, and **Abbe Herzig**, American Mathematical Society.

AMS Advocacy Panel: Advocacy for Mathematics and Science Policy, organized by **Karen Saxe**, American Mathematical Society; Thursday, 9:30–11:00 am. Moderator and panelists to be announced.

AMS Panel on Open Access and Mathematics: Open publishing models, licensing and copyright, and equity, organized by **Robert Harington**, American Mathematical Society, and **Nicola Poser**, American Mathematical Society; Thursday, 11:00 am–12:00 pm.

AMS Committee on Education Panel Discussion: Forming institutional collaborations to broaden student access, organized by **Michael Dorff**, Brigham Young University, **Doug Ensley**, Shippensburg University, and **Katherine Stevenson**, California State University, Northridge; Thursday, 1:00–2:30 pm. The moderator and panelists are to be announced. This panel is sponsored by the AMS Committee on Education.

AMS Committee on the Profession Panel Discussion: Impact of the Pandemic on the Profession, organized by **Ruth Charney**, Brandeis University, **Peter Ebenfelt**, University of California, San Diego, **Ellen Eischen**, University of Oregon, **Gail Letzter**, NSA, and **Hee Oh**, Yale University; Thursday, 2:00–3:30 pm. The moderator for this panel is **Peter Ebenfelt**,

¹<https://jointmathematicsm meetings.org/abstract.pl?type=jmm.%20>

University of California, San Diego. Panelists are **Allison Henrich**, Seattle University, **Andrew Kobin**, Emory University, **Jill Pipher**, Brown University, and **Talitha Washington**, Clark Atlanta University & Atlanta University Center. This panel is sponsored by the AMS Committee on the Profession.

AMS Task Force on Understanding and Documenting the Historical Role of the AMS in Racial Discrimination: A year after, organized by **Kasso Okoudjou**, Tufts University, and **Francis Su**, Harvey Mudd College; Friday, 10:40 am–12:00 pm. Panelists are **Jim Lewis**, University of Nebraska-Lincoln, **Kasso Okoudjou**, Tufts University, **Adriana Salerno**, Bates College, and **Francis Su**, Harvey Mudd College.

AMS Committee on Science Policy Panel Discussion: What's after science policy? – How getting involved in science policy enhances careers, organized by **Duane Cooper**, Morehouse College, **Rachel Levy**, 2020–21 AMS/AAAS Congressional Policy Fellow, and **Natalie Shiels**, OptumLabs at UnitedHealth Group; Friday, 2:30–4:00 pm. The moderator is **Natalie Shiels**, OptumLabs at UnitedHealth Group. Panelists are **Carla Cotwright-Williams**, US Department of Defense, **Lloyd Douglas**, independent consultant, **Catherine Paolucci**, University of Florida, **Karoline Pershell**, Service Robotics and Technologies, and **James Ricci**, Schmidt Futures. This panel is sponsored by the Committee on Science Policy.

AMS DC-Based Policy & Communications Opportunities, organized by **Karen Saxe**, American Mathematical Society; Friday, 4:30–6:30 pm. Speakers for this session are **A.J. Stewart**, AMS Congressional Fellow 2021–22, and **Tamar Lichter Blanks**, AMS-AAAS Mass Media Fellow 2021.

AMS Committee on Meetings and Conferences Panel: Holding AMS Meetings and Conferences in Localities with Discriminatory Practices, organized by **Emma Previato**, Boston University; Saturday, 8:00–9:30 am. The moderator is **Lourdes Juan**, Texas Tech University. Panelists are **Juliette Bruce**, University of California, Berkeley, **Edray Goins**, Pomona College, and **Kasso Okoudjou**, Tufts University. This panel is sponsored by the AMS Committee on Meetings and Conferences.

AMS Panel: The Future of Books for Graduate Students and Research Mathematicians, organized by **Sergei Gelfand**, American Mathematical Society, and **Eriko Hironaka**, AMS Book Program; Saturday, 10:30 am–12:00 pm.

AMS Workshops

Please see complete descriptions of these sessions on the JMM website.

2022 AMS Department Chairs Workshop. This annual one-day workshop for department chairs, leaders, and prospective leaders is held on Tuesday, January 4, 2022, 9:00 am–2:00 pm, the day before the JMM begins, and is led by **Luca Capogna**, Smith College, **Anne Fernando**, Norfolk State University, **Kevin Knudson**, University of Florida, and **Emille Davie Lawrence**, University of San Francisco.

The Workshop will provide an opportunity to share experiences about issues and trends that have an impact on math department chairs, math departments, and colleges and universities. Topics could include resources, handling stress (students, staff, and faculty), curriculum, and instructional delivery; participants who register by December 8 will have the opportunity to suggest additional topics. The organizers expect the Workshop to help build a community of leaders who can continue to exchange ideas and offer support and advice.

The registration fee is US\$200 (includes lunch and reserved seating for the JMM opening reception on January 5 at 6:15 pm). Please register online by December 31.² For more details, see the Workshop webpage.³ Please send questions to Kim Kuda (kak@ams.org) in the AMS Programs Department.

AMS Workshop: Teaching and Managing Large Undergraduate Mathematics Courses in a Changing World, organized by **P. Gavin LaRose**, University of Michigan, and **Bryan Mosher**, University of Minnesota; Part I, Thursday, 1:00–3:00 pm, and Part II, Friday, 10:00 am–12:00 pm.

Other AMS Events

Please see complete descriptions of these sessions on the JMM website.

Council, Tuesday, 1:30 pm.

Business Meeting, Saturday, 11:45 am.

MAA-SIAM-AMS Hrabowski-Gates-Tapia-McBay Session, organized by **Carrie Diaz Eaton**, Bates College; Friday, 9:00–10:30 am. This year the session will consist of a lecture from 9:00–9:50 am given by **Dave Kung**, Charles A. Dana Center, University of Texas at Austin, *Title to be announced*, and a short panel discussion, *Title to be announced*, from 9:50–10:30 am. Panelists to be announced.

Career Fair, Thursday, 8:30–10:30 am. Here's a new opportunity for mathematically trained **job seekers** at various phases of education and experience—graduate students, undergraduates, postdoctoral, and others—to interact in-person with **employers** in business, industry, and government (BIG). This event is your chance to network and learn what it takes to do a BIG job. If your company is interested in participating, for US\$200, a table will be provided for your posters and

²<https://ebus.ams.org/ebus/Default.aspx?TabID=1531&productId=1181840025>

³<https://www.ams.org/chairsworkshop>

printed materials, and you are welcome to speak to interested students personally. Complimentary coffee will be served, sponsored by the AMS.

Grad School Fair, Friday, 8:30–10:30 am. 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 JMM 2020, over 300 students met with representatives from more than 70 graduate programs. If your school has a graduate program and you are interested in participating, for **US\$130**, a table will be provided for your posters and printed materials, and you are welcome to personally speak to interested students. Complimentary coffee will be served, sponsored by the AMS.

Current Events Bulletin, organized by **David Eisenbud**, Mathematical Sciences Research Institute; Friday, 2:00–6:00 pm.
Mathematically Bent Theater, featuring Colin Adams and the Mobiusbandaid Players; Friday, 6:00–7:00 pm.

AMS Short Course on 3D Printing: Challenges and Applications

Monday–Tuesday, January 3–4, 2022

This Short Course has been organized by **Maria Trnkova**, University of California, Davis, and **Andrew Yarmola**, Princeton University, and combines seven introductory lectures and tutorials with two workshops that offer a hands-on experience with 3D printing and model design. Speakers include **Silviana Amethyst**, University of Wisconsin-Eau Claire, **David Bachman**, Pitzer College, **Gabriel Dorfsman-Hopkins**, University of California, Berkeley, **Elisabetta Matsumoto**, Georgia Institute of Technology, **Henry Segerman**, Oklahoma State University, and **Bethany Weeks**, Boeing Additive Manufacturing.

There are separate registration fees to participate in this course. Please see the complete Short Course announcement on page 1682 of this issue, or go to <https://www.ams.org/short-course>.

AMS Travel Grants

PUI Faculty Travel Grants. The AMS is excited to announce a new opportunity for faculty at primarily-undergraduate institutions (PUI) to receive funding to support participation in JMM. Grant funds can be used to offset expenses for travel, registration, lodging, and meals. One advantage of this funding is that it can be used to support participation in the Short Course or the Chairs Workshop. Additional information will be available soon on the AMS Travel Grants webpage.⁴

Graduate Student Travel Grants. The AMS, with funding from a private gift, will be accepting applications for partial travel support for graduate students attending the Joint Mathematics Meetings in Seattle, Washington, January 5–8, 2022. The awards, not to exceed US\$500, will ideally be matched by travel funds from the student's institution, but this is not a strict requirement.

Applications will be accepted ONLY from doctoral students in mathematics who are in their last year of study; i.e., applicants must not have received their doctoral degrees before the travel takes place but must expect to receive them within twelve months of the JMM. No student shall receive a grant more than once. Information can be found on the AMS Graduate Student Travel Grants webpage.⁵

Undergraduate Student Travel Grants. With support from the National Science Foundation, the AMS is offering travel support to a limited number of undergraduate students who are presenting in the following JMM sessions: Pi Mu Epsilon Undergraduate Poster Session, AMS-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-baccalaureate Programs, and Other Special or Contributed Sessions at the Joint Mathematics Meetings in Seattle, Washington, January 5–8, 2022.

The award amounts are anticipated to be up to US\$1,080 to defray travel, housing, and subsistence. Applications are especially encouraged from students from groups that have been underrepresented in the mathematical sciences and from those with a need for travel support. Information can be found on the AMS Undergraduate Travel Grants webpage.⁶

Please also see the section on Child Care Grants.

American Association for the Advancement of Science

The AAAS-AMS Invited Address will be given by **Kavita Ramanan**, Brown University, *Title to be announced*; Friday, 11:10 am.

AAAS will also host an **AAAS Special Session**; more information on this session can be found under the heading *American Association for the Advancement of Science Special Sessions* above.

⁴<https://www.ams.org/travel-grants>

⁵<https://www.ams.org/student-travel>

⁶<https://www.ams.org/undergrad-tg>

American Statistical Association

The *ASA Committee of Presidents of Statistical Societies (COPSS) Lecture* will be given by **Xihong Lin**, Harvard University, Broad Institute of MIT and Harvard, *Learning from COVID-19 Data on Transmission, Health Outcomes, Interventions and Vaccination*.

ASA will also host an *ASA Special Session*, affiliated with the COPSS Lecture; more information on this session can be found under the heading *American Statistical Association Special Sessions* above.

ASA will host a reception Thursday. Please see the listing in the *Social Events* section of the announcement.

Association for Symbolic Logic

Please see complete descriptions of these sessions on the JMM website.

Association for Symbolic Logic Tutorial: From noncommutative algebra to model theory - via Poisson algebras, Parts I & II, organized by **Reed Solomon**, ASL; Wednesday, 9:00–10:00 am and 2:00–3:00 pm. The speaker for these tutorial sessions is **Omar Leon Sanchez**, University of Manchester.

The *ASL Invited Address* program will take place on Friday and Saturday. The program will include invited addresses by **Jeremy Avigad**, Carnegie Mellon University, *The promise of formal mathematics*; **Omer Ben-Nuria**, Einstein Institute of Mathematics, Jerusalem, *Diamonds compactness and ultrafilters in set theory*; **Peter Cholak**, University of Notre Dame, *Ramsey like Theorems on the Rationals*; **Franziska Jahnke**, University of Münster, *Decidability and definability in unramified henselian valued fields*; **Sandra Müller**, Technical University of Vienna, *Lower bounds in Set Theory*; **Lynn Scow**, California State San Bernardino, *Semi-retractions and the Ramsey Property*; and **Erik Walsberg**, Vassar College, *Model theory of large fields*.

ASL will also host an *ASL Contributed Paper Session* on Friday afternoon and an *ASL Special Session* on Thursday; more information on this session can be found under the heading *Association for Symbolic Logic Special Sessions* above.

Association for Women in Mathematics

Please see complete descriptions of these sessions on the JMM website.

AWM Panel: Non-Traditional Careers in Mathematics, organized by **Alice Mark**, Vanderbilt University; Wednesday, 2:15–3:40 pm. Panel moderator is **Alice Mark**, Vanderbilt University. Panelists are to be announced.

Business Meeting, Wednesday, 3:45–4:15 pm. Chair, **Kathryn Leonard**, AWM President.

AWM Panel: AWM 101 for Men, What You Need to Know about Women in Math, organized by **Rhonda Olson**, Arizona State University; Thursday, 8:00–9:30 am. Panelists are to be announced.

The *AWM-AMS Noether Lecture* will be delivered on Thursday at 10:05 am by **Marianna Csörnyei**, University of Chicago, on *The Kakeya needle problem for rectifiable sets*.

AWM Workshop Poster Presentations and Reception, Friday, 4:00–5:30 pm. AWM will conduct its workshop poster presentations by women graduate students. This session is open to all JMM attendees. Organizers for these presentations are **Irina Mitrea**, Temple University, **Julie Rana**, Lawrence University, **Radmila Sazdanovic**, North Carolina State University, **Janet Striuli**, Fairfield University, and **Isabel Vogt**, University of Washington. The Poster Judging Coordinator is **Matthew Krauel**, California State University, Sacramento. AWM seeks volunteers to serve as mentors for workshop participants. If you are interested, please contact the AWM office at awm@awm-math.org.

Association for Women in Mathematics Reception and Awards Presentation, Friday, 5:00–6:30 pm. The AWM Reception is open to all JMM participants and will begin at 5:00 pm, during the poster presentations. At 6:00 pm, the AWM President will recognize all of the honorees of the AWM Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman, the recipients of the AWM Dissertation Prize, the AWM Service Awards, and the AWM Fellows. Please see the listing in the *Social Events* section of the announcement.

AWM Workshop: Women in Algebraic Geometry (WiAG), organized by **Julie Rana**, Lawrence University, and **Isabel Vogt**, University of Washington; Saturday, 8:00 am–12:00 pm and 1:00–5:00 pm. In 2022, the AWM Workshop will be hosted by the Research Network Women in Algebraic Geometry (WiAG). This workshop will showcase the research of women and nonbinary mathematicians working in algebraic geometry and related fields. In particular, this special session will feature several talks reporting on the results of collaborations formed at the WiAG conference held at ICERM in the summer of 2020. A Poster Session for graduate students and recent PhDs will be held in conjunction with the workshop on Friday. Updated information about the workshop is available at www.awm-math.org.

AWM also has a number of *AWM Special Sessions*. A full list of these sessions can be found under the heading *Association for Women in Mathematics Special Sessions* above.

Consortium for Mathematics and its Applications

Please see complete descriptions of these sessions on the JMM website.

COMAP Workshop: An Introduction to COMAP's Certificate in Modeling (CiM) Program for Educators, organized by Michelle Isenhour and Kathi Snook, Consortium for Mathematics and Its Applications; Wednesday, 1:00–4:00 pm.

COMAP Professional Development Workshop: Leveraging Math Modeling Contests to Bring More Interdisciplinarity to You, Your Students, and Your Colleagues, organized by Amanda Beecher, Ramapo College of New Jersey, and Kathi Snook, Consortium for Mathematics and Its Applications; Friday, 9:00 am–12:00 pm.

COMAP also has a **COMAP Special Session**. More information on this session can be found under the heading *Consortium for Mathematics and its Applications Special Sessions* above.

International Linear Algebra Society

The **ILAS Invited Address** will be given on Wednesday at 9:00 am by **Pauline van den Driessche**, University of Victoria, BC, Canada, on *Sign Patterns Meet Dynamical Systems*.

ILAS also has a number of **ILAS Special Sessions**. A full list of these sessions can be found under the heading *International Linear Algebra Society Special Sessions* above.

Julia Robinson Mathematics Festival

Please see complete descriptions of these sessions on the JMM website.

JRMF Workshop, organized by **Daniel Kline**, Julia Robinson Mathematics Festival; Friday, 2:00–3:30 pm.

The Julia Robinson Mathematics Festival will also provide engaging activities during the JMM Grand Opening Reception on Wednesday evening and in the JMM Exhibits on Saturday.

Mathematical Sciences Research Institute

MSRI has a number of **MSRI Special Sessions**. A full list of these sessions can be found under the heading *Mathematical Sciences Research Institute Special Sessions*.

MSRI will also host a reception on Friday; please see the listing in the *Social Events* section of the announcement.

National Association of Mathematicians

Please see complete descriptions of these sessions on the JMM website.

The Haynes-Granville-Browne Session of Presentations by Recent Doctoral Recipients in the Mathematical Sciences will take place on Friday, 1:00–5:00 pm.

The Cox-Talbot Address will be given by **Robert Q. Berry, III**, University of Virginia, *Interest Convergence: An analytical viewpoint for examining how power dictates policies and reforms in mathematics*, Friday after the banquet. See details about the banquet on Friday in the *Social Events* section.

NAM Panel Discussion, Saturday, 10:30–11:30 am. Title and panelists are to be announced.

The NAM Business Meeting will take place on Saturday, 9:00–10:00 am.

The Clayton-Woodard Lecture will be given by **Monica Jackson**, American University, *Spatial Data Analysis for Public Health Data* on Saturday at 1:00 pm.

Pi Mu Epsilon

Please see complete descriptions of these sessions on the JMM website.

Pi Mu Epsilon (PME) Council Meeting, Thursday, 8:00–11:30 am.

AMS - PME Student Poster Session, organized by **Chad Awtrey**, Samford University, **Paul Fishback**, Grand Valley State University, and **Eric Ruggieri**, College of the Holy Cross; Friday, 10:30 am–12:00 pm and 3:30–5:00 pm. These sessions feature research done by undergraduate students. First-year graduate students are eligible to present if their research was completed while they were still undergraduates. Research by high school students can be accepted if the research was conducted under the supervision of a faculty member at a post-secondary institution.

Appropriate content for a poster includes, but is not limited to, a new result, a new proof of a known result, a new mathematical model, an innovative solution to a Putnam problem, or a method of solution to an applied problem. Purely expository material is not appropriate for this session.

Participants should submit an abstract through the JMM abstract submission portal by **September 21**; notification of acceptance or rejection will be sent by approximately **October 12**. Questions regarding this session should be directed to **Chad Awtrey**, cawtrey@samford.edu, **Paul Fishback**, fishbacp@mail.gvsu.edu, or **Eric Ruggieri**, eruggier@holycross.edu.

PME Panel: What Every Student Should Know about the JMM, organized by **Jennifer Beineke**, Western New England University, and **Tom Wakefield**, Youngstown State University; Wednesday, 9:00–10:20 am. Panelists are **Jennifer Beineke**, Western New England University, and **Tom Wakefield**, Youngstown State University. This panel is sponsored by Pi Mu Epsilon.

Society for Industrial and Applied Mathematics

Please see complete descriptions of these sessions on the JMM website.

SIAM Minisymposia for JMM 2022 will take place Wednesday–Saturday. There are 8 Minisymposia. A full list of these sessions can be found under the heading *Society for Industrial and Applied Mathematics Minisymposia* above.

See also the session cosponsored by SIAM in the *American Mathematical Society Special Sessions* listing, *AMS-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs*, organized by **Darren A. Narayan**, Rochester Institute of Technology.

The **SIAM Invited Address** will be delivered by **Qiang Du**, Columbia University, *Analysis and Applications of Nonlocal Models*, on Thursday at 11:10 am.

SIAM Panel on a BIG world view: Business-Industry-Government Careers for Mathematicians, organized by **Sharon Arroyo**, The Boeing Company; Thursday, 8:00–9:30 am. Panelists to be announced.

MAA-SIAM-AMS Hrabowski-Gates-Tapia-McBay Session, organized by **Carrie Diaz Eaton**, Bates College; Friday, 9:00–10:30 am. This year the session will consist of a lecture from 9:00–9:50 am given by **Dave Kung**, Charles A. Dana Center, University of Texas at Austin, *Title to be announced*, and a short panel discussion, *Title to be announced*, from 9:50–10:30 am. Panelists to be announced.

The **MAA-AMS-SIAM Gerald and Judith Porter Public Lecture** will be given by **Lauren K Williams**, Harvard University, *Title to be announced*; Saturday, 3:00 pm.

SIAM will also host a reception; please see the listing in the *Social Events* section of the announcement.

Spectra: Association for LGBT Mathematicians

Please see complete descriptions of these sessions on the JMM website.

Wikipedia Edit-a-Thon, organized by **Keri Sather-Wagstaff**, Clemson University, **Marie Vitulli**, University of Oregon, and **Ursula Whitcher**, Mathematical Reviews (AMS); day and time to be announced.

This will be a hands-on event. Participants will use laptops and/or tablets and will be immediately guided into editing on Wikipedia. Collaboration amongst the participants will be encouraged. Additional resources will be provided online to allow participants to continue to learn about editing after the event. The organizing team is made up of women and nonbinary members of the LGBTQIA+ community. This event is jointly sponsored by the AMS and Spectra.

Spectra Workshop: Identifying Best Practices Fostering Inclusion and Retention of LGBTQ Mathematicians, organized by **Ron Buckmire**, Occidental College, **Chris Goff**, University of the Pacific, and **Alexander Hoover**, University of Akron; Wednesday, 4:30–6:00 pm.

Spectra Lavender Lecture, organized by **Juliette Bruce**, University of California, Berkeley, and **Alexander Hoover**, University of Akron; Thursday, 11:00 am. The Spectra Lavender Lecture honors LGBTQ+ mathematicians who have made significant contributions to the mathematical sciences, mathematical education, or the mathematical community at large. Speaker to be announced.

Spectra Panel: Navigating the Job Market as an LGBTQ Mathematician, organized by **David Crombecque**, University of Southern California, and **Lily Khadjavi**, Loyola Marymount University, Los Angeles; Friday, 1:00–2:20 pm.

Spectra Business Meeting, organized by **Juliette Bruce**, University of California, Berkeley; Friday, 3:00–4:00 pm.

Spectra will also host a reception; please see the listing in the *Social Events* section of the announcement.

Transforming Post-Secondary Education in Mathematics

Please see complete descriptions of these sessions on the JMM website.

TPSE Math Panel: Exploring the Future of Mathematics Education – what should we be teaching?, organized by **Scott Wolpert**, University of Maryland and TPSE Math, and **Michael Dorff**, Brigham Young University and TPSE Math; Wednesday, 9:00–10:30 am. At JMM 2022, TPSE will showcase a panel of innovators in undergraduate data science curricula: Professor **Johanna Hardin**, Pomona College, MAA Hogg Award for Excellence in Teaching Introductory Statistics; Professor **Deanna Needell**, UCLA, Dunn Family Endowed Chair in Data Theory; and Professor **Talitha Washington**, Atlanta University Center Consortium, Director Data Science Initiative. The panel will be moderated by **Sylvester James Gates, Jr.**, Brown Theoretical Physics Center Director, Ford Foundation Professor of Physics, Affiliate Mathematics Professor, and

Faculty Fellow, Watson Institute for International Studies and Public Affairs at Brown University. Gates served on the 2016 US President's Council of Advisors on Science and Technology (PCAST) and the National Commission on Forensic Science.

TPSE Math Panel: Developing Innovative Upper Division Pathways in Mathematics: Strategies for Enrollment and Inclusion, organized by **Rick Cleary**, Babson College, and **William Yslas Velez**, University of Arizona; Friday, 1:00–2:30 pm. Panelists to be announced.

JMM Sessions and Events

Professional Enhancement Programs (PEP)

Professional Enhancement Programs (PEP) are open only to persons who register for the Joint Meetings and pay the Joint Meetings registration fee in addition to the appropriate Professional Enhancement Program (PEP) fee. The AMS reserves the right to cancel any PEP that is undersubscribed. Participants should read the descriptions of each PEP thoroughly as some require participants to bring their own laptops and special software; laptops will not be provided in any PEP. The enrollment in each PEP is limited to 50; the cost is US\$100.

Please see complete descriptions of these JMM Professional Enhancement Programs (PEP) on the JMM website.

Professional Enhancement Program (PEP) #1. *A Complex Transition to Advanced Undergraduate Mathematics*, presented by **Bob Sachs**, George Mason University, **Hortensia Soto**, Colorado State University, and **Paul Zorn**, St. Olaf College; Part A, Wednesday, 9:00–11:00 am, and Part B, Friday, 9:00–11:00 am.

Professional Enhancement Program (PEP) #2. *Breaking the Cycle of Mechanisms of Inequality in Mathematics Teaching and Learning*, presented by **Nicole M. Joseph**, Vanderbilt University, and **William Yslas Velez**, University of Arizona; Part A, Wednesday, 1:00–3:00 pm, and Part B, Thursday, 1:00–3:00 pm.

Professional Enhancement Program (PEP) #3. *Developing Mathematics Programs for Workforce Preparation in Data Science and Other Applications*, presented by **Rick Cleary**, Babson College, and **Chris Malone**, Winona State University; Part A, Wednesday, 1:00–3:00 pm, and Part B, Saturday, 1:00–3:00 pm.

Professional Enhancement Program (PEP) #4. *Evidence-based Practices for More Effective Mentoring Relationships*, presented by **Pamela E. Harris**, Williams College, and **Abbe Herzig**, American Mathematical Society; Part A, Friday, 1:00–3:00 pm, and Part B, Saturday, 1:00–3:00 pm. Cosponsored by the American Mathematical Society, The Center for Minorities in the Mathematical Sciences, and Lathisms.

Professional Enhancement Program (PEP) #5. *From LaTeX to RMarkdown: Communication and Collaboration Tools for the Mathematical Sciences*, presented by **Omar De La Cruz Cabrera**, Kent State University; Part A, Wednesday, 4:00–6:00 pm, and Part B, Friday, 4:00–6:00 pm.

Professional Enhancement Program (PEP) #6. *Glimpses of mathematics from robotics: simple kinematic problems for the planar robot arms*, presented by **Lydia Novozhilova**, Western Connecticut State University, **Hasib Rahmiyar**, Stony Brook University, and **Hieu Nguyen**, University of Connecticut; Part A, Thursday, 9:00–11:00 am, and Part B, Thursday, 1:00–3:00 pm.

Professional Enhancement Program (PEP) #7. *Inclusive Active Learning in Undergraduate Mathematics*, presented by **Nancy Kress**, University of Colorado at Boulder, **Rebecca Machen**, University of Colorado at Boulder, **Wendy Smith**, University of Nebraska-Lincoln, and **Matt Voigt**, Clemson University; Part A, Wednesday, 9:00–11:00 am, and Part B, Friday, 9:00–11:00 am.

Professional Enhancement Program (PEP) #8. *Mathematical Modelling Of Real-World Infectious Disease Epidemics – An R Based Hands-On Professional Enhancement Program*, presented by **Ashok Krishnamurthy**, Mount Royal University; Part A, Wednesday, 4:00–6:00 pm, and Part B, Friday, 4:00–6:00 pm.

Professional Enhancement Program (PEP) #9. *Recruiting and Mentoring Majors in the Mathematical Sciences*, presented by **Jason Aubrey** and **William Y. Velez**, University of Arizona; Part A, Thursday, 8:00–10:00 am, and Part B, Saturday, 9:00–11:00 am.

Professional Enhancement Program (PEP) #10. *Teaching a Tiling Theory Course*, presented by **Colin Adams**, Williams College; Part A, Wednesday, 1:00–3:00 pm, and Part B, Thursday, 1:00–3:00 pm.

Professional Enhancement Program (PEP) #11. *Using Your Voice for Influence and Impact: Incorporating Mathematics into Public Discourse*, presented by **Kira Hamman**, Penn State Mont Alto, **Scott Hershberger**, American Mathematical Society, **Karen Saxe**, American Mathematical Society, **Francis Su**, Harvey Mudd College, and **Scott Turner**, American Mathematical Society; Part A, Wednesday, 8:00–10:00 am, and Part B, Friday, 8:00–10:00 am.

Professional Enhancement Program (PEP) #12. *Visualizing Projective Geometry Through Photographs and Perspective Drawings*, presented by **Annalisa Crannell**, Franklin and Marshall College, and **Fumiko Futamura**, Southwestern University; Part A, Wednesday, 4:00–6:00 pm, and Part B, Friday, 1:00–3:00 pm.

JMM Sessions

JPBM Communications Award Lecture. **Talithia Williams**, Harvey Mudd College, will be presented with the JPBM Communications Award at the Joint Mathematics Meetings (JMM) in Seattle, Washington. Her public lecture will take place Saturday, 1:30–2:30 pm.

JMM Panels

Please see complete descriptions of these sessions on the JMM website.

JMM Panel: Effective DEI Efforts in Math Departments, organized by **Christine Kelley**, University of Nebraska-Lincoln, **Agnes Beaudry**, University of Colorado, Boulder, **Ben Braun**, University of Kentucky, and **Jim Lewis**, University of Nebraska-Lincoln; Thursday, 8:00–10:00 am. We strongly encourage mathematicians at all career stages, from undergraduate and graduate students through senior faculty, to attend and participate. Panelists to be announced.

JMM Panel: International Engagement in Mathematical Sciences Research During the COVID-19 Pandemic, organized by **Overtoun Jenda**, Auburn University, **Paul Horn**, University of Denver, and **Suzanne Lenhart**, University of Tennessee; Thursday, 11:00 am–12:00 pm. The moderator for this panel is **Overtoun Jenda**, Auburn University. Panelists are **Paul Horn**, University of Denver, **Suzanne Lenhart**, University of Tennessee, and **Fred Roberts**, Rutgers University.

Joint Committee on Women Panel, Thursday, 1:00–2:30 pm.

JMM Workshops

Please see complete descriptions of these sessions on the JMM website.

JMM Workshop: Black Mathematicians Edit-A-Thon, Thursday, 8:00 am–1:00 pm.

JMM Workshop: How to Create Data Science Summer Training for Faculty and Students, organized by **Eric Mintz**, Clark Atlanta University, **Torina Lewis**, American Mathematical Society, and **Talithia Washington**, Atlanta University Center Consortium; Thursday, 9:00 am–12:00 pm.

JMM Professional Development Workshop: Mathematicians Navigating Parenthood, organized by **Katharine Gurski**, Howard University, **Angela Peace**, Texas Tech University, **Olivia Prosper**, University of Tennessee, **Tracy Stepien**, University of Florida, and **Miranda Teboh-Ewungkem**, Lehigh University; Friday, 1:00–4:00 pm.

Programs of Other Organizations

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 those details.

Please see complete descriptions of these sessions on the JMM website.

Aquincum Institute of Technology-Budapest Semesters-Math in Moscow-Mathematical Sciences Semesters in Guanajuato Panel Discussion: New Horizons, Exploring the Possibilities and Benefits of Study Abroad Programs Post-Pandemic, organized by **Kate Clancy**, Mathematical Sciences Semesters in Guanajuato; Friday, 6:00–7:00 pm. Panelists include **Ran Libeskind-Hadas**, Aquincum Institute of Technology, **Tina Garrett**, Budapest Semesters in Mathematics, **Ryota Matsuura**, Budapest Semesters in Mathematics Education, and **William Velez**, Mathematical Sciences Semesters in Guanajuato.

Association of Christians in the Mathematical Sciences (ACMS) Reception and Lecture, Thursday, 6:00–8:00 pm. The reception will take place between 6:00–7:00 pm, followed by a short program and 20-minute talk by **Karl-Dieter Crisman** of Gordon College, *Title to be announced*. Students are encouraged to attend, and the opportunity will be provided afterwards for delegates to go to dinner at local restaurants.

Conference Board of the Mathematical Sciences Panel Discussion: Action Responses for Social Justice, Equity, Diversity, and Inclusion from CBMS Member Societies, organized by **David Bressoud**, Macalester College, and **C. David Levermore**, University of Maryland; Wednesday, 1:00–2:30 pm. Panelists include **Michael Steele**, University of Wisconsin, Milwaukee, **Omayra Ortega**, Sonoma State University, **Ron Buckmire**, Occidental College, **Francis Su**, Harvey Mudd College, and **Michael Pearson**, Mathematical Association of America.

Journal of Humanistic Mathematics: Mathematical Poetry Reading, organized by **Gizem Karaali**, Pomona College, **Larry Lesser**, University of Texas El Paso, and **Douglas Norton**, Villanova University; Thursday, 7:00–8:00 pm. This event is sponsored by the *Journal of Humanistic Mathematics*.

Lathisms Panel Discussion: Testimonios, Stories of Latinx and Hispanic Mathematicians, organized by **Pamela E. Harris**, Williams College, **Andrés R. Vindas Meléndez**, University of California Berkeley & MSRI, **Rosaura Uscanga**, Mercy College, **Vanessa Rivera Quiñones**, BeCode, **Alicia Prieto-Langarica**, Youngstown State University, and **Luis Sordo Vieira**, University of Florida; Friday, 7:30–8:30 pm. Panelists include **James Álvarez**, The University of Texas at Arlington, **Federico Ardilla**, San Francisco State University, **Selenne Bañuelos**, California State University Channel Islands, **Erika**

Tatiana Camacho, Arizona State University, and **Anastasia Chavez**, University of California, Davis. Moderated by **Pamela E. Harris**, Williams College, and **Andrés R. Vindas Meléndez**, University of California Berkeley & MSRI.

The Math Alliance Panel Discussion: Fifteen Years of Building a New American Community in the Mathematical and Statistical Sciences, organized by **David Goldberg**, Purdue University, **Philip Kutzko**, University of Iowa, and **William Vélez**, University of Arizona; Thursday, 10:30 am–12:00 pm. Panelists and moderators include **Rodrigo Bañuelos**, Purdue University, **Jaqueline Hughes Oliver**, North Carolina State University, **Leslie McClure**, Drexel University, **William Vélez**, University of Arizona, **Philip Kutzko**, University of Iowa, **David Goldberg**, Purdue University, **Ranthyony Edmonds**, Ohio State University, **Isaac Harris**, Purdue University, **Danielle Middlebrooks**, NIST, and other panelists to be announced.

Mathematics of Doing, Understanding, Learning, and Educating for Secondary Schools (MODULE(S2)) Workshop: Strengthening Mathematics Content Instruction in Mathematics Courses That Secondary Mathematics Education Majors Take, organized by **Stephanie Casey**, Eastern Michigan University, **Brynja Kohler**, Utah State University, **Alyson Lischka**, Middle Tennessee State University, and **Jeremey Strayer**, Middle Tennessee University; Friday, 9:00 am–12:00 pm.

MathHappens Foundation Panel Discussion: Making Math more Accessible, Venturing into Public Arenas, organized by **Lauren Siegel**, MathHappens Foundation; Wednesday, 9:00–10:30 am. Panelists to include **Josephine Sheng**, MathHappens Foundation, **Paola Garcia**, MathHappens Foundation, **Lina Germann**, STEM Santa Fe, and **Amy Shell-Gellasch**, Eastern Michigan University. **Lauren Siegel**, MathHappens Foundation, is the moderator for this panel discussion.

National Association of Math Circles Demo: Mind Reading with Math, organized by **Javier Haro**, American Institute of Mathematics, and **James Taylor**, MathAmigos and Math Circles Collaborative of New Mexico; Saturday, 10:00–11:30 am.

National Science Foundation (NSF)

Please see complete descriptions of these sessions on the JMM website.

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 as the exhibits. Times that staff will be available will be posted at the booth.

Poster Session: NSF Education Programs in the Mathematical Sciences, organized by **Michael Ferrara**, **Sandra Richardson**, **John Haddock**, and **Lee Zia**, Division of Undergraduate Education, National Science Foundation; Thursday, 2:00–4:00 pm.

Session on Outcomes and Innovations from NSF Undergraduate Education Programs in the Mathematical Sciences, organized by **Michael Ferrara**, **Sandra Richardson**, **John Haddock**, and **Lee Zia**, Division of Undergraduate Education, National Science Foundation; Saturday, 9:00 am–12:00 pm and 1:00–4:00 pm.

Information Session on NSF Programs in the Directorate for Education and Human Resources, organized by **Michael Ferrara**, **Sandra Richardson**, **John Haddock**, and **Lee Zia**, Division of Undergraduate Education, National Science Foundation, and **Margret Hjalmanson**, Division of Research on Learning in Formal and Informal Settings, National Science Foundation; Friday, 9:00–11:00 am.

NSF Division of Mathematical Sciences (DMS) Panel, day and time to be announced. Organized by **Henry Warshall**.

Project NExT

Project NExT Workshop, Wednesday–Saturday, 8:00 am–6:00 pm.

Project NExT Lecture on Teaching, **Edray Goins**, Pomona College, *Addressing Anti-Black Racism in Our Departments*; Thursday, 11:10 am–12:00 pm.

Project NExT Reception, organized by **Alissa Crans**, Loyola Marymount University, **Trish Hammer**, Virginia Tech University, **David Kung**, St Mary's College of Maryland, and **Stephanie Salomone**, University of Portland; Friday, 8:00–10:00 pm. All Project NExT Fellows, consultants, and other friends of MAA Project NExT are invited.

Relatively Prime Live: Around the Campfire, Thursday, 6:00–7:00 pm.

Special Interest Groups of the MAA (SIGMAA)

Please see complete descriptions of these sessions on the JMM website.

SIGMAA on Environmental Mathematics (SIGMAA EM)

Lightning Talks in Environmental Mathematics, Thursday, 6:00–7:00 pm. Moderators are **Russ deForest**, Pennsylvania State University, and **Amanda Beecher**, Ramapo College of New Jersey.

SIGMAA on Environmental Mathematics Business Meeting, Thursday, 7:00–7:30 pm.

SIGMAA on Environmental Mathematics Guest Lecture, Thursday, 7:30–8:30 pm. **Heather Price**, Professor of Chemistry, North Seattle College, *Climate Justice Integrated Learning in STEM*.

SIGMAA on the History of Mathematics (HOMSIGMAA)

SIGMAA on the History of Mathematics Guest Lecture, Wednesday, 5:00–6:00 pm. **Adrian Rice**, Randolph-Macon College, *Beyond the Strength of a Woman's Physical Power: Mathematics, Machines, and the Mind of Ada Lovelace*.

SIGMAA on Mathematical Knowledge for Teaching (SIGMAA MKT)

See *AMS Special Session on Mathematical knowledge for teaching high school and college calculus courses* (sponsored by SIGMAA MKT).

SIGMAA on the Philosophy of Mathematics

SIGMAA on the Philosophy of Mathematics Guest Lecture, Friday, 5:30–6:30 pm. **Nicolas Fillion**, Simon Fraser University, *Trust but Verify: What Can We Know About the Reliability of a Computer-Generated Result?*

SIGMAA on Undergraduate Research

SIGMAA on Undergraduate Research Panel Discussion: What did you do? What will you keep? Reflections on mentoring undergraduate researchers during and post-pandemic, organized by **Allison Henrich**, Seattle University, **Lara Pudwell**, Valparaiso University, and **Yunus Zeytuncu**, University of Michigan-Dearborn; Thursday, 10:00–11:30 am. Panelists include **Andrea Bertozzi**, UCLA, **Lazaros Gallos**, DIMACS, Rutgers University, and **Pamela Harris**, Williams College.

See also *AMS Special Session on Programs That Support Student Research - SIGMAA on Undergraduate Research*.

Summer Program for Women in Mathematics (SPWM) Reunion, organized by **Murli M. Gupta**, George Washington University; Thursday, 1:00–3:00 pm. See www.gwu.edu/~spwm.

Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations (SIMIODE) Workshop: Differential Equations: A Toolbox for Modeling the World in Your Classroom with Your Students, organized by **Brian Winkel** and **Kurt Bryan**, SIMIODE; Thursday, 1:00–3:00 pm, and Saturday, 1:00–3:00 pm.

Sessions for Students

Please see complete descriptions of these sessions on the JMM website.

PME Panel: What Every Student Should Know about the JMM, organized by **Jennifer Beineke**, Western New England University, and **Tom Wakefield**, Youngstown State University; Wednesday, 9:00–10:20 am. Panelists are **Jennifer Beineke**, Western New England University, and **Tom Wakefield**, Youngstown State University. This panel is sponsored by Pi Mu Epsilon.

Grad School Fair, Friday, 8:30–10:30 am. Sponsored by the AMS.

AMS - PME Student Poster Session, organized by **Chad Awtrey**, Samford University, **Paul Fishback**, Grand Valley State University, and **Eric Ruggieri**, College of the Holy Cross; Friday, 10:30 am–12:00 pm and 3:30–5:00 pm. These sessions feature research done by undergraduate students. First-year graduate students are eligible to present if their research was completed while they were still undergraduates. Research by high school students can be accepted if the research was conducted under the supervision of a faculty member at a post-secondary institution.

Appropriate content for a poster includes, but is not limited to, a new result, a new proof of a known result, a new mathematical model, an innovative solution to a Putnam problem, or a method of solution to an applied problem. Purely expository material is not appropriate for this session.

Participants should submit an abstract through the JMM abstract submission portal by **September 21**; notification of acceptance or rejection will be sent by approximately **October 12**. Questions regarding this session should be directed to **Chad Awtrey**, cawtrey@samford.edu, **Paul Fishback**, fishbacp@mail.gvsu.edu, or **Eric Ruggieri**, eruggier@holycross.edu.

Other Events

Mathematical Art Exhibition, organized by **Robert Fathauer**, Tessellations Company, and **Nathan Selikoff**, Digital Awakening Studios, and supported by the Bridges Organization. A popular feature at the 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. Topology, fractals, polyhedra, and tiling are some of the ideas at play here. Do not miss this unique opportunity for a different perspective on mathematics. The exhibition will be located inside the Joint Mathematics Meetings Exhibits and open during the same exhibit hours.

Exhibits

The Joint Mathematics Meetings Exhibits include the country's leading scientific publishers, professional organizations, companies that offer mathematics-enrichment products and services, computer hardware and software companies, and the Mathematical Art Exhibition. It will be open to all registered participants on Wednesday (starting with the Grand

Opening Reception), 6:15–8:30 pm, on Thursday and Friday, 9:00 am–5:00 pm, and on Saturday, 9:00 am–12:00 pm. See more details on the JMM website.

Welcoming Environment Policy

The AMS strives to ensure that participants in the JMM, including exhibitors, enjoy a welcoming environment. In all its activities, the AMS seeks to foster an atmosphere that encourages the free expression and exchange of ideas. The AMS supports equality of opportunity and treatment for all participants, regardless of gender, gender identity or expression, race, color, national or ethnic origin, religion or religious belief, age, marital status, sexual orientation, disabilities, veteran status, or immigration status.

Harassment is a form of misconduct that undermines the integrity of AMS activities and mission.

The AMS will make every effort to maintain an environment that is free of harassment, even though it does not control the behavior of third parties. A commitment to a welcoming environment is expected of all participants of JMM activities, including mathematicians, students, guests, staff, contractors and exhibitors, and participants in scientific sessions and social events. To this end, the AMS will include a statement concerning its expectations towards maintaining a welcoming environment in registration materials for the JMM, and has put in place a mechanism for reporting violations. Violations may be reported confidentially and anonymously to 855-282-5703 or at www.mathsociety.ethicspoint.com. The reporting mechanism ensures the respect of privacy while alerting the AMS to the situation.

Assistance may also be sought from any staff or volunteer member wearing a MathSafe badge. Learn more about the MathSafe program on the JMM website.⁷ Violations may also be brought to the attention of the AMS Director of Meetings & Conferences at the registration desk during the meeting.

How to Reserve Hotel Rooms

See details about hotels and how to reserve a room on the JMM website.

Importance of Staying in an Official JMM Hotel

The importance of reserving a room at one of the official JMM hotels cannot be stressed enough. The AMS makes every effort to keep participants' expenses at the meeting as low as possible and a lot of work and effort goes into negotiating the most affordable hotel rates. When a participant registers for the meeting and reserves a room at an official JMM hotel, they are helping to support not only JMM 2022, but future JMMs as well.

Reserving a Room

Participants are encouraged to register for the JMM in order to reserve hotel rooms at the JMM rates. If a participant needs to reserve a hotel room before they are registered for the JMM, they should contact the Mathematics Meetings Services Bureau (MMSB) at mmsb@ams.org or 1-800-321-4267 (ext. 4137 or ext. 4144) for further instructions.

Special rates have been negotiated exclusively for this meeting at the following hotels: Sheraton Grand Seattle, Grand Hyatt Seattle, Hyatt at Olive 8 Seattle, Inn at the Washington Athletic Club, Hilton Garden Inn Seattle Downtown, and Crowne Plaza Seattle Downtown. See details on these hotels and more details on the JMM website.⁸

Reservations must be made through the MMSB. The hotels will not be able to accept reservations directly until after **December 13, 2021**. At that time, rooms and rates will be based on availability. Any rooms reserved directly with the hotels after **December 13, 2021** will be subject to higher rates.

A link to the JMM 2022 hotel reservation portal will be included in the confirmations of registrations sent by email. If a participant needs the link sent directly to them, they should send a request to mmsb@ams.org. If any participant has difficulty reserving a hotel room, they should send email to mmsb@ams.org for assistance.

Any participant who needs to reserve a hotel room and does not have a credit card to guarantee it should send email to mmsb@ams.org for further instructions. If a check is being used to guarantee a room, the reservation and check must be received by the MMSB no later than **December 1, 2021**.

⁷<https://www.jointmathematicsm meetings.org/jmm-mathsafe>

⁸https://www.jointmathematicsm meetings.org/2268_hotelpage

Miscellaneous

Please see details about audio-visual equipment; email services; information distribution; local information; the JMM Broadcasting, Photographing, and Videotaping Policy; and telephone messages on the JMM website.

Child Care Grants

Please see details about how to apply for child care grants on the JMM website.

Registration Information

Everyone is welcome at the JMM. The American Mathematical Society (AMS) encourages all participants to register for the JMM. The importance of registering for the meeting cannot be overemphasized. Paying a registration fee helps to support a wide range of activities associated with planning, organizing, and executing the meetings.

All participants who wish to attend sessions are expected to register for the JMM and should be prepared to show their badges, if so requested. Badges are required to enter the Exhibits and the Employment Center. The Mathematics Meetings Service Bureau (MMSB) is the official registration and housing bureau for the meeting and will be available to assist you with your registration and housing arrangements.

Cancellation Policy

To cancel a registration for the JMM, PEP, Short Course, or banquet tickets and be eligible to receive 50% of fees paid, please do so by **January 3, 2022**. No refunds will be issued after this date.

Deadlines

Register by **December 20, 2021, midnight EST** to be eligible for discounted registration fees. After this date, registration will continue through the end of the meeting but increased fees will apply.

Updates and corrections received too late to be included in the program books will be included in the online program on the JMM website and in the JMM Mobile App.

Register for the Meeting

Registration can only be done online. Paper registration forms are no longer available. To register for the meeting, go to the online registration form⁹ and choose "Register." You will be asked to enter your email address and to sign in with your personal AMS web account. If you do not have an AMS web account, you will need to create one. After you have signed in, proceed with completing the registration form.

VISA, MasterCard, Discover, and American Express are the only methods of payment accepted for online registrations, and charges to credit cards will be made in US funds. Registration acknowledgments will be sent to the email addresses provided. Once you complete your registration and pay for it, you will see a link to the hotel portal, in which you will be able to reserve a hotel room.

Special Registration Codes

To allow for easy tracking of registrations for participants that belong to certain groups, some participants will need a registration code to register. Some of these groups are Commercial Exhibitors, Art Exhibitors, Career Fair Exhibitors, and Grad School Fair Exhibitors. Participants who are attending the JMM solely to participate as part of one of these groups should contact the MMSB at mmsb@ams.org to receive a code. Employers in the Employment Center should contact Programs at emp-info@ams.org to receive a code. Participants in other groups will be notified directly by the MMSB.

See more details about how to register for the meeting at https://www.jointmathematicsm meetings.org/2268_reg.

⁹<https://ebus.ams.org/ebus/Meetings/MeetingDetails.aspx?productId=1167524890>

Joint Mathematics Meetings Registration Fees

	By Dec. 20	After Dec. 20
Member of AMS, AWM, ASA, NAM, or SIAM.....	US\$360.....	US\$473
Nonmember.....	570.....	727
Graduate Student.....	80.....	94
Undergraduate Student.....	80.....	94
High School Student.....	80.....	94
Unemployed.....	80.....	94
Retired.....	80.....	94
Developing Country Participant.....	80.....	94
High School Teacher.....	80.....	94
Librarian.....	80.....	94
One-day Only–Member (AMS, AWM, ASA, NAM, or SIAM).....	N/A.....	257
One-day Only–Nonmember.....	N/A.....	400
Non-mathematician Guest.....	25.....	25
Commercial Exhibitor.....	0.....	0
Art Exhibitor.....	0.....	0
Professional Enhancement Program (PEP).....	100.....	100
Grad School Fair Table.....	130.....	130
Department Chairs Workshop.....	200.....	200
Career Fair Table.....	200.....	200
AMS Short Course:		
Member.....	151.....	185
Nonmember.....	232.....	275
Student/Unemployed/Emeritus.....	84.....	105

Registration Category Definitions

Full-time Students

Any person who is currently working toward a degree or diploma is eligible for this category. Students are asked to determine whether their status can be described as a graduate (working toward a degree beyond the bachelor's), an undergraduate (working toward a bachelor's degree), or high school (working toward a high school diploma) and to mark the registration form accordingly.

Retired

Any person who has been a member of the AMS for twenty years or more and who retired because of age or long-term disability from his or her latest position is eligible for this category.

Emeritus (for Short Course)

Any person who has been a member of the AMS for twenty years or more and who retired because of age or long-term disability from his or her latest position is eligible for this category.

Librarian

Any librarian who is not a professional mathematician is eligible for this category.

Unemployed

Any person who is currently unemployed, is actively seeking employment, and is not a student is eligible for this category. This category is not intended to include any person who has voluntarily resigned or retired from his or her latest position.

Developing Country Participant

Any person who is employed in a developing country, where salary levels are radically not commensurate with those in the US, is eligible for this category. See the most recent list of developing countries on the ISI website.¹⁰

¹⁰<https://www.isi-web.org/capacity-building/developing-countries>

Non-mathematician Guest

Any family member, friend, or associate who is not a mathematician and who is accompanied by a participant in the meeting is eligible for this category. Guests will receive a badge and may attend any session, talk, or other event at the meeting.

Commercial Exhibitor

Any person who is exhibiting in the Joint Mathematics Meetings Exhibits is eligible for this category. This does not include anyone participating in a poster session. Any exhibitor who is a mathematician and is participating in the scientific program and/or wants to attend sessions, talks, etc. is expected to register separately for the meeting.

Art Exhibitor

Any person who is exhibiting in the Mathematical Art Exhibition is eligible for this category. This does not include anyone participating in a poster session. Any exhibitor who is a mathematician and is participating in the scientific program and/or wants to attend sessions, talks, etc. is expected to register separately for the meeting.

Social Events

All events listed are open to all registered participants. It is strongly recommended that for any event requiring a ticket, tickets be purchased through advanced 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 tickets to the Mathematics Meetings Service Bureau (MMSB) by **January 1, 2022**. After that date, no refunds can be made. Special meals are available at banquets upon advance request, but this must be indicated on the Advanced Registration/Housing Form.

Please see complete descriptions of these events on the JMM website.

American Statistical Association's Justice, Equity, Diversity, Inclusion Reception, Thursday, 6:00–7:00 pm.

Association of Christians in the Mathematical Sciences (ACMS) Reception and Lecture, Thursday, 6:00–8:00 pm. The reception will take place between 6:00 and 7:00 pm, followed by a short program and 20-minute talk by **Karl-Dieter Crisman** of Gordon College.

Association for Women in Mathematics Reception and Awards Presentation, Friday, 5:00–6:30 pm. The AWM Reception is open to all JMM participants and will begin at 5:00 pm, during the poster presentations. At 6:00 pm, the AWM President will recognize all of the honorees of the AWM Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman, the recipients of the AWM Dissertation Prize, the AWM Service Awards, and the AWM Fellows.

Budapest Semesters in Mathematics Annual Alumni Reunion, Thursday, 6:00–7:00 pm.

Canada/USA Mathcamp, Thursday, 6:00–8:00 pm. Visit <https://www.mathcamp.org/alumni/> for more details.

University of Chicago Mathematics Alumni Reception, Thursday, 6:00–7:00 pm.

Grand Opening Reception, Wednesday, 6:15–8:30 pm.

ICERM Mixer, Friday, 6:00–7:30 pm.

University of Illinois at Urbana-Champaign, Friday, 5:30–7:30 pm.

Johns Hopkins University Department of Mathematics and the Department of Applied Mathematics & Statistics Reception, Thursday, 6:00–7:30 pm.

Knitting Circle, Thursday, 8:15–9:45 pm. Bring a project (knitting/crochet/tatting/beading/etc.) and chat with other mathematical crafters!

University of Maryland Reception for Alumni and Friends, Friday, 5:30–7:30 pm.

Mathematical Reviews Reception, Friday, 6:00–7:00 pm.

Mathematical Institutes Open House, Thursday, 6:00–8:30 pm.

The Mathematical Sciences Research Institute (MSRI) Reception for Current and Future Donors, Friday, 5:00–6:30 pm. For more information about the event or becoming an MSRI supporter, please contact development@msri.org.

MEET and SHARE: A Mathematicians' Storytelling Event, presented by The Coalition for the Amplification of Historically Excluded Mathematicians (The Coalition). Day and time to be announced.

University of Michigan Alumni and Friends Reception, day and time to be announced.

National Association of Mathematicians Banquet, Friday, 6:00–8:40 pm. A cash bar reception will be held at 6:00 pm, and dinner will be served at 6:30 pm. Tickets are US\$65 each, including tax and gratuity. The Cox-Talbot Invited Address, *Interest Convergence: An analytical viewpoint for examining how power dictates policies and reforms in mathematics*, will be given by **Robert Q. Berry, III**, University of Virginia, after the dinner.

Nebraska Conference for Undergraduate Women in Mathematics Reunion, Thursday, 7:00–8:00 pm. go.unl.edu/ncuwmm

Penn State's Eberly College of Science and Department of Mathematics Reception, Thursday, 6:00–8:00 pm. Attendance is free, but registration is required by visiting <https://engage.tassl.com/event/9049>.

Project NExT Reception, Friday, 8:00–10:00 pm. All Project NExT Fellows, consultants, and other friends of MAA Project NExT are invited. Organizers are **Alissa Crans**, Loyola Marymount University, **Trish Hammer**, Virginia Tech University, **David Kung**, St Mary's College of Maryland, and **Stephanie Salomone**, University of Portland.

PROMYS and Ross Reception for Alumni and Friends, day and time to be announced.

SCUDEM Gathering and Information Session, Friday, 7:00–8:30 pm.

SIMIODE NSF Workshops Gathering Meeting, Thursday, 7:00–8:30 pm.

Society for Industrial and Applied Mathematics (SIAM) Reception on Industrial Math Modeling, Thursday, 7:00–9:00 pm.

Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) Reception, Thursday, 12:00–1:00 pm.

Spectra Reception for LGBT Mathematicians, day and time to be announced.

Texas A&M University Mathematics Department Reception for Alumni, Students, and Faculty, Friday, 6:00–7:30 pm.

University of Washington Department of Mathematics, Thursday, 7:00–9:00 pm.

Yearly Gather: Collaborative Puzzle Time!, Thursday, 6:30–8:00 pm. Organized by **sarah-marie belcastro**, MathILy, **Alice Mark**, MathILy-Er and Vanderbilt University, and **Max Engelstein**, MathILy-EST and U Minnesota.

Travel/Transportation

Please see details about travel and transportation options on the JMM website.¹¹

¹¹https://www.jointmathematicsm meetings.org/meetings/national/jmm2022/2268_travel