

# Full Program

## Tuesday, January 07

### AMS Department Chairs and Leaders Workshop

TUESDAY, JANUARY 07 8:00AM–3:00PM Jefferson, Fourth Floor, Sheraton Grand Seattle

This annual one-day workshop for department chairs, leaders, and prospective leaders will be held on Tuesday, January 7, 2025, 9:00 am–3:00 pm. The workshop will provide opportunities to share experiences with issues and trends that have an impact on math department chairs, math departments, and colleges and universities. More details about registration and associated fees will be available on the workshop web page. Please send questions to [chairsworkshop@ams.org](mailto:chairsworkshop@ams.org).

Organizers: **Julius Njome Esunge**, University of Mary Washington  
**Timothy Flood**, Pittsburg State University  
**Charles Moore**, Washington State University  
**Jennifer Schaefer**, Dickinson College  
**Kelly Lang**, American Mathematical Society  
**Kelly Lang**, American Mathematical Society

### BEGIN Bootcamp

TUESDAY, JANUARY 07 9:00AM–3:00PM Issaquah, Third Floor, Sheraton Grand Seattle

The AMS BEGIN Bootcamp will prepare jobseekers, particularly early-career mathematicians, to apply for positions in business, entrepreneurship, government, industry, and nonprofit (BEGIN) sectors. Session topics will include CV to STEM resume-building, strategies for effective self-introductions, locating jobs and internships, and networking opportunities with mathematicians in BEGIN industries.

Organizers: **Anna Kinzel**, American Mathematical Society  
**Alex Howe**, American Mathematical Society

### Joint Meetings Registration

TUESDAY, JANUARY 07 2:00PM–7:00PM Atrium Lobby, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

## Wednesday, January 08

### Joint Meetings Registration

WEDNESDAY, JANUARY 08 7:00AM–3:00PM Atrium Lobby, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

### (1) AMS Contributed Paper Session on Biology and Other Natural Sciences, I

WEDNESDAY, JANUARY 08 8:00AM–11:45AM 308, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

8:00AM (1.1) *Photo bleaching of organic semiconductors via high throughput methods and Self-Driving Laboratories*

**Jose Dario Perea**<sup>\*</sup>, Solestructuras (1203-92-42836)

8:15AM ► (1.2) *Sequential backmapping: Stepwise reconstruction of all-atomic configurations from coarse-grained structures*

**Erin Wong**<sup>\*</sup>, Great Neck South High School, **John Nicholson**, Swathmore College, **Georgios Kementzidis**, Stony Brook University and **Yuefan Deng**, Stony Brook University (1203-92-41406)

8:30AM ► (1.3) *Exploring the Relationship Between pH, Channel Gating, and Seizure Activity Through Mathematical Modeling*

**Riley Hale**<sup>\*</sup>, Middlebury College, **Liza Platonov**, Middlebury College and **Jennifer Crodelle**, Middlebury College (1203-92-39198)

8:45AM ► ◆ (1.4) *Intransitive competition in ecological systems: the even/odd hypothesis and its breakdown in more complex interaction contexts*

**Daniel Paul Maes**<sup>\*</sup>, PhD Candidate, Department of Mathematics, University of Michigan--Ann Arbor and **Annette Ostling**, Assistant Professor, Integrative Biology, University of Texas at Austin (1203-92-39966)

9:00AM ► ◆ (1.5) *Using theory of approximation to mathematically model the estimation of aloin concentration in Aloe Vera L. (Aloe Barbadosis Mill.)*

**Said Antonio Kas-Danouche**<sup>\*</sup>, Andrews University (AU), Universidad de Oriente (UDO), Universidad Adventista Dominicana (UNAD), Lake Nelson Adventist Academy (LNAA) and **Tamara Molero**, Instituto Tecnológico de Santo Domingo (INTEC), La Universidad del Zulia (LUZ), Universidad Adventista Dominicana (UNAD) (1203-104-45253)

9:15AM ► (1.6) *Multi-scale Temporal Modeling of Predator-Prey Dynamics*

**Viktoriya Savatorova**<sup>\*</sup>, Central Connecticut State University and **Aleksei Talonov**, University of Nevada Las Vegas (1203-34-37685)

9:30AM (1.7) *Examining the Impact of Nondimensionalization on Partial Rank Correlation Coefficient when Modeling the Epithelial Mesenchymal Transition in Carcinomas*

**Kelsey Gasior**<sup>\*</sup>, University of Notre Dame (1203-92-39632)

9:45AM ► (1.8) *Assessing the impact of seasonality on *Wolbachia*-based controls for mosquito-borne diseases*

**Joshua Panatex Lopez**<sup>\*</sup>, University of Texas at San Antonio (1203-92-43758)

- 10:00AM  
▶ ◆ (1.9) *CANCELLED Optimizing Gene Drive Mosquito Release Strategies for Malaria Control on Príncipe Island: An Agent-Based Model Approach*  
**Sipkaduwa Arachchige Sashika Sureni Wickramasooriya\***, University of California, Davis (1203-92-45055)
- 10:15AM  
▶ (1.10) *Stochastic Modeling of SARS-CoV-2 Evolution: Impact of Vaccination and Social Distancing on Viral Adaptation*  
**Barsha Saha\***, University of Missouri-Kansas City (1203-92-43088)
- 10:30AM  
▶ (1.11) *CANCELLED A Simple and Practical Improvement to Row and Column Based Laboratory Pooling*  
**Tony Macula\***, JEANSEE, LLC (1203-92-43433)
- 10:45AM  
▶ (1.12) *Computational Topology-Driven Machine Learning Models for Protein-Protein Binding Free Energy and RNA-like Structure Predictions*  
**Rui Wang\***, New York University (1203-92-43624)
- 11:00AM  
▶ (1.13) *Promising Machine Learning techniques for the classification of breast tumors using simulated voltages from Electrical Impedance Tomography*  
**Emily Jean Corcoran\***, Marquette University and **Sarah Jane Hamilton**, Marquette University (1203-92-44884)
- 11:15AM  
▶ (1.14) *Combining Machine Learning with Bayesian Analysis to Predict Spread of MSRA infections within a Urban Anchor Hospital*  
**Kiel Daniel Corkran\***, University of Missouri-Kansas City's Midwest Virtual Laboratory (1203-92-45546)
- 11:30AM  
▶ ◆ (1.15) *LMArabiPhos : Prediction of phosphorylation sites in Arabidopsis Thaliana using embeddings from a pre-trained protein language model*  
**Meenal Chaudhari\***, Assistant Professor of Computer Science, Illinois State University, **Pawel Pratyush**, PhD Candidate, Golisano College of Computing and Information Sciences, Rochester Institute of Technology and **Dukka KC**, Professor and Chair, Golisano College of Computing and Information Sciences, Rochester Institute of Technology (1203-92-45755)

### AMS Directors of Graduate Studies Focus Group

**WEDNESDAY, JANUARY 08 8:00AM–9:30AM Grand Ballroom D, Second Floor, Sheraton Grand Seattle**

For directors of graduate study, chairpersons, and others leading graduate mathematical sciences programs, this event provides a venue in which to share ideas and concerns surrounding the experience of graduate students. Those intending to participate are invited to email [programs@ams.org](mailto:programs@ams.org) by December 4, 2024 (subject line: DGS Focus Group) to be placed on the contact list for this event and to send any questions or topics they would like to be discussed.

Organizers: **Tyler Kloefkorn**, American Mathematical Society  
**Sarah Bryant**, American Mathematical Society  
**Kayla M. Roach**, American Mathematical Society  
**Sarah Bryant**, American Mathematical Society

### (2) AMS Special Session on Advancements in Artificial Intelligence for Data Analysis: From Creativity to Innovation, I

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 612, Level Six, Seattle Convention Center Arch at 705 Pike**

- Organizers: **Qin Sheng**, Baylor University  
**Tsung-Jen Shen**, Graduate Institute of Statistics, National Chung Hsing University  
**Yin-Tzer Shih**, National Chung Hsing University  
**Hung-Hsu Tsai**, Graduate Institute of Data Science and Information Computing, National Chung Hsing University
- 8:00AM  
▶ (2.1) *A study of local and global error analysis of exponential splitting for multidimensional data stream simulations*  
**Qin Sheng**, Baylor University, **Yin-Tzer Shih\***, Department of Applied Mathematics, National Chung Hsing University and **Eduardo Servin Torres**, Baylor University (1203-65-42505)
- 8:30AM  
▶ (2.2) *An algorithm for approximating the 2D Kawarada data with cross derivative term via finite differences*  
**Eduardo Servin\***, Baylor University (1203-65-42843)
- 9:00AM  
◆ (2.3) *On the construction of saturated split-plot designs for quadratic response surface models*  
**Chang-Yun Lin\***, National Chung Hsing University, Taiwan (1203-62-39261)
- 9:30AM  
▶ (2.4) *Addressing Non-Independent Sampling with Markov Chain Models when Enhancing Biodiversity Estimates*  
**Tsung-Jen Shen\***, Graduate Institute of Statistics, National Chung Hsing University (1203-62-39739)
- 10:00AM  
▶ (2.5) *Contrastive Discrepancy Maximization for Unsupervised Domain Adaptation*  
**Hung-Hsu Tsai\***, Graduate Institute of Data Science and Information Computing, National Chung Hsing University and **Lin-Chieh Huang**, Graduate Institute of Data Science & Information Computing, National Chung-Hsing University (1203-68-40264)
- 10:30AM  
▶ ◆ (2.6) *Leveraging LLM Embeddings in Traditional Machine Learning Recommendation Systems*  
**Kari Eifler\***, Microsoft Corporation (1203-68-44031)
- 11:00AM  
▶ (2.7) *Automated Detection of Arousals and Sleep Apnea Events: A Deep Learning Approach Using Time-Frequency Encoding and Residual Stacked BiLSTM Networks*

**Chih-En Kuo**<sup>\*</sup>, Graduate Institute of Data Science and Information Computing, National Chung Hsing University and **Hao-Hsiang Wang**, Graduate Institute of Data Science and Information Computing, National Chung Hsing University (1203-68-41478)

- 11:30AM  
▶ (2.8) *Machine Learning Approaches for Predicting Antimicrobial Resistance and Genetic Markers in Staphylococcus aureus Clinical Isolates with MALDI-TOF MS*  
**Dr. Yi-Hsin Chen, MD, PhD**<sup>\*</sup>, Department of Applied Mathematics and Institute of Statistics, National Chung Hsing University, Taichung, Taiwan, Department of Nephrology, Taichung Tzu Chi Hospital, Taichung, Taiwan and **Yin-Tzer Shih**, Department of Applied Mathematics, National Chung Hsing University (1203-92-40909)

**(3) AMS Special Session on Advances in Function Theoretic Operator Theory, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 205, Level Two, Seattle Convention Center Arch at 705 Pike

- Organizers: **Raymond Cheng**, Old Dominion University  
**Christopher Felder**, Indiana University Bloomington
- 8:00AM  
(3.1) *Inner-outer factorization of noncommutative functions and applications*  
**Michael T. Jury**<sup>\*</sup>, University of Florida (1203-47-43935)
- 9:00AM  
▶ (3.2) *Cyclic functions through the spectrum of an operator*  
**Miguel Monsalve**, Universidad Complutense de Madrid and **Daniel Seco**<sup>\*</sup>, Universidad de La Laguna (1203-30-44380)
- 10:00AM  
(3.3) *What relations can two noncommutative analytic functions satisfy?*  
**Meric Langston Augat**<sup>\*</sup>, James Madison University, **Robert T.W. Martin**, University of Manitoba and **Eli Shamovich**, Ben-Gurion University of the Negev (1203-47-45412)
- 10:30AM  
(3.4) *Weird extremal problems in Hardy spaces, minimal projections, Beurling's theorem in the  $H^p$  setting and zeros of optimal polynomial approximants.*  
**Dmitry Khavinson**<sup>\*</sup>, University of South Florida (1203-30-40695)
- 11:00AM  
(3.5) *Invariant subspaces of the Cesaro operator*  
**William Thomas Ross**<sup>\*</sup>, University of Richmond (1203-47-39265)
- 11:30AM  
(3.6) *Applications of Operator Theory to Machine Learning on Dynamical Systems*  
**Benjamin P. Russo**<sup>\*</sup>, Riverside Research (1203-47-41835)

**(4) AMS Special Session on Algebraic Statistics in Our Changing World, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM Yakima 1, Level 1, Seattle Convention Center Arch at 800 Pike

Organizers: **Elizabeth Gross**, University of Hawaii at Manoa  
**Jose Israel Rodriguez**, University of Wisconsin-Madison  
**Teresa Yu**, University of Michigan  
**Yulia Alexandr**, University of California, Los Angeles

- 8:00AM  
▶ ◆ (4.1) *Constraining the outputs of a ReLU neural network*  
**Yulia Alexandr**, University of California, Los Angeles and **Prof. Guido Francisco Montufar**<sup>\*</sup>, MPI MiS (1203-68-42588)
- 8:30AM  
▶ (4.2) *Noncommutative zonoids and their applications*  
**Eliza O'Reilly**<sup>\*</sup>, Johns Hopkins University and **Venkat Chandrasekaran**, Caltech (1203-52-42845)
- 9:00AM  
▶ (4.3) *Supermodular Rank of Probability Distributions*  
**Rishi Sonthalia**<sup>\*</sup>, UCLA, **Anna Seigal**, University of Oxford and **Prof. Guido Francisco Montufar**, MPI MiS (1203-52-44155)
- 9:30AM  
(4.4) *Moment Tensor Decompositions: From Theory to Computation*  
**Joe Kileel**<sup>\*</sup>, University of Texas at Austin (1203-65-38135)
- 10:00AM  
(4.5) *Actor critic algorithms for fiber sampling problems*  
**Sonja Petrovic**<sup>\*</sup>, Illinois Institute of Technology and **Ivan Gvozdanovic**, Illinois Institute of Technology (1203-62-43661)
- 10:30AM  
(4.6) *Likelihood Geometry of the Squared Grassmannian*  
**Hannah Friedman**<sup>\*</sup>, UC Berkeley (1203-62-40434)
- 11:00AM  
▶ ◆ (4.7) *Marginal Independence and Partial Set Partitions*  
**Francisco Ponce Carrion**<sup>\*</sup>, North Carolina State University and **Seth Sullivant**, North Carolina State University (1203-62-43880)
- 11:30AM  
▶ (4.8) *Gaussian Voronoi Diagrams*  
**Julia Lindberg**<sup>\*</sup>, University of Texas-Austin (1203-62-41616)

**(5) AMS Special Session on Arithmetic Dynamics of Single and Multiple Maps, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 604, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Xander Faber**, IDA / Center for Computing Sciences  
**Bella Tobin**, Oregon State University  
**Robert L Benedetto**, Amherst College
- 8:00AM  
(5.1) *Specializations of Iterated Galois Groups of PCF Rational Functions*  
**Jamie Juul**<sup>\*</sup>, Colorado State University, **Robert L Benedetto**, Amherst College, **Dragos Ghioca**, University of British Columbia and

**Thomas John Tucker**, University of Rochester (1203-37-41633)

- 8:30AM (5.2) *Profinite Iterated Monodromy Groups of PCF Unicritical Polynomials*  
**Trevor Hyde**, Vassar College and **Ophelia Adams**, University of Rochester (1203-37-41393)
- 9:00AM (5.3) *Square patterns in dynamical orbits*  
**Vefa Goksel**, Towson University and **Giacomo Micheli**, University of South Florida (1203-11-41879)
- 9:30AM (5.4) *Bad reduction of PCF maps*  
**Patrick Ingram**, York University, **Michelle Manes**, American Institute of Mathematics and **Xander Faber**, IDA / Center For Computing Sciences (1203-37-44453)
- 10:00AM (5.5) *Necklaces, Permutations, and Periodic Critical Orbits for Quadratic Polynomials*  
**Matthew Baker**, Georgia Institute of Technology, **Andrea Chen**, Bergen County Academies, **Sophie Li**, University of California, Los Angeles, **Matthew Qian**, Concord-Carlisle High School and **Leonna Wang**, Stuyvesant High School (1203-05-40130)
- 10:30AM (5.6) *Local Fields, Iterated Extensions and Julia Sets*  
**Donald Lee**, University of Hawaii at Manoa (1203-11-43904)
- 11:00AM (5.7) *The Master Teapot: hidden structures in entropies of critically periodic quadratic polynomials*  
**Kathryn Anne Lindsey**, Boston College (1203-37-40791)
- 11:30AM (5.8)  *$p$ -adic Mandelbrot sets and their radii*  
**Jacqueline Anderson**, Bridgewater State University (1203-37-41249)

**(6) AMS Special Session on Business, Entrepreneurship, Government, Industry and Nonprofit (BEGIN) Career Development within Mathematics Programs, I**

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM Skagit 3, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **Anna Kinzel**, American Mathematical Society  
**Kelly Lang**, American Mathematical Society

- 8:00AM (6.1) *BEGIN at Department of Mathematics, Florida State University*  
**Giray Okten**, Florida State University (1203-103-38394)
- 8:30AM (6.2) *Industrial Immersion Program at George Mason University (GMU)*  
**Igor Griva**, Department of Mathematical Sciences, George Mason University (1203-103-39614)
- 9:00AM (6.3) *Establishing effective PhD professional development programs. Working with your PhD alumni and utilizing existing grants to save time and money.*

**Roman Holowinsky**, The Ohio State University/The Erdos Institute (1203-103-43383)

- 10:00AM (6.4) *Bridging Mathematical Sciences and Industry: Strategic Initiatives by the Department of Mathematical Sciences at the University of Texas at Dallas*  
**Vladimir Dragovic**, The University of Texas at Dallas, **Kemelli Estacio-Hiroms**, The University of Texas at Dallas and **Natalia Humphreys**, The University of Texas at Dallas (1203-101-41755)
- 11:00AM (6.5) *What the BYU Mathematics Department is Doing to Successfully Prepare Undergraduates for Careers in Business, Industry, and Government*  
**Michael Dorff**, Brigham Young University, **Emily J Evans**, Brigham Young University, **Tyler Jarvis**, Brigham Young University and **Paul Jenkins**, Brigham Young University (1203-103-42406)

**(7) AMS Special Session on Coding Theory for Modern Applications, I**

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 605, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Allison Beemer**, University of Wisconsin-Eau Claire

**Eduardo Camps**, Cleveland State University  
**Rafael D'Oliveira**, Clemson University  
**Hiram H. Lopez**, Virginia Tech

- 8:00AM (7.1) *Bounds Niederreiter-Rosenbloom-Tsfasman LCD codes*  
**Wellington Santos**, University of Wisconsin-Stout (1203-94-44432)
- 8:30AM (7.2) *Algebraic construction of Quasi-Cyclic Codes*  
**Henry Chimal-Dzul**, University of Texas at San Antonio (1203-94-44816)
- 9:00AM (7.3) *New Approaches to Leverage Side Information in PIR*  
**Anoosheh Heidarzadeh**, Santa Clara University (1203-94-43547)
- 9:30AM (7.4) *A Monotone Circuit Construction for Individually-Secure Multi-Secret Sharing*  
**Cailyn Bass**, Clemson University, **Alejandro Cohen**, Technion, **Rafael D'Oliveira**, Clemson University and **Muriel Medard**, MIT (1203-94-43847)
- 10:00AM (7.5) *Coding for Private Distributed Learning*  
**Rawad Bitar**, Technical University of Munich (1203-94-45015)
- 10:30AM (7.6) *Self-Duplicating Random Walks for Failure Resilience*  
**Salim El Rouayheb**, Rutgers University, **Maximilian Egger**, Technical University of Munich, **Ghadir Ayache**, NA, **Rawad Bitar**, Technical University of Munich and **Antonia Wachter-Zeh**, Technical University of Munich (1203-94-45231)

11:00AM (7.7) *Rank Metric Codes from Drinfeld Modules*  
**Luca Bastioni**, The University of South Florida,  
**Mohamed O. Darwish**, The University of South Florida and **Giacomo Micheli**, University of South Florida (1203-11-45134)

11:30AM (7.8) *Logical Clifford gates for hypergraph product codes*  
**Alexander Barg**, University of Maryland and **Adway Patra**, University of Maryland (1203-81-42609)

**(8) AMS Special Session on Cohomology of Arithmetic Groups, Mapping Class Groups, and Moduli Spaces, I**

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WEDNESDAY, JANUARY 08 8:00AM–12:00PM 614, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Sam Payne**, UT Austin

**Andrew Putman**, University of Notre Dame

8:00AM (8.1) *Congruence Subgroups of Braid Groups*  
**Dan Margalit**, Vanderbilt University (1203-20-45900)

9:00AM (8.2) *Computation of the homology groups of graph configuration spaces through quantitative representation stability*  
**Eric G Ramos**, Stevens Institute of Technology and **Claudia Yun**, University of Michigan (1203-55-39164)

9:30AM (8.3) *Steinberg Modules for Rings*  
**Matthew Scalamandre**, University of Toronto - Scarborough (1203-55-40608)

10:00AM (8.4) *Isometric embeddings of Teichmüller spaces*  
**Frederik Benirschke**, The University of Chicago and **Carlos Andres Marcelo Serván**, The University of Chicago (1203-57-40684)

10:30AM (8.5) *Graph homology classes via hyperoctahedral symmetries.*  
**Benjamin C. Ward**, BGSU (1203-55-40763)

11:00AM (8.6) *Hyperelliptic curves, the scanning map, and moments of families of quadratic L-functions*  
**Jonas Bergström**, Stockholm University, **Adrian Diaconu**, University of Minnesota, **Dan Petersen**, Stockholm University and **Craig Christopher Westerland**, University of Minnesota (1203-55-38884)

**(9) AMS Special Session on Conservation Laws and Boundary Value Problems in far from Equilibrium Dynamics, I**

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WEDNESDAY, JANUARY 08 8:00AM–11:30AM 303, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **James G Glimm**, State University of New York at Stony Brook

**Snezhana I. Abarzhi**, California Institute of Technology

8:00AM (9.1) *Turbulence via intermolecular potential*

**Rafail Abramov**, University of Illinois Chicago (1203-76-36534)

8:30AM (9.2) *Numerical modeling and simulation of parachute inflation by tracking an immersed elastic interface in incompressible flow*  
**Xiaolin Li**, Stony Brook University (1203-76-44495)

9:00AM (9.3) *Coarse Models of Multiphase Flows from Fully Resolved Simulations*  
**Gretar Tryggvason**, Johns Hopkins University (1203-76-44490)

9:30AM (9.4) *Recent Developments in the Modeling of Turbulence*  
**James G Glimm**, State University of New York at Stony Brook (1203-76-36521)

10:00AM (9.5) *Fluid Instabilities and Interfacial Mixing*  
**Snezhana I. Abarzhi**, California Institute of Technology (1203-35-38769)

10:30AM (9.6) *Exact unsteady solution to the n-dimensional compressible Navier-Stokes equations*  
**Sergey Georgy Chefranov**, Obukhov Institute of Atmospheric Physics (1203-76-37714)

11:00AM (9.7) *Connecting two problems in inviscid fluid dynamics and mathematical consequences*  
**Saleh Tanveer**, The Ohio State University and **Darren G Crowdy**, Mathematics, Imperial College (1203-76-44799)

**(10) AMS Special Session on Dynamical Systems Modeling Approaches Across Multiple Biological Scales, I**

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WEDNESDAY, JANUARY 08 8:00AM–12:00PM Skagit 5, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Daniel Brendan Cooney**, University of Illinois Urbana-Champaign

**Chadi M Saad-Roy**, University of California, Berkeley

**Chris M. Heggerud**, University of California, Davis

8:00AM (10.1) *Hybrid stochastic SIS epidemic models with vaccination: Stability of the disease-free state and applications*  
**Nhu Nguyen**, University of Rhode Island (1203-92-43836)

8:30AM (10.2) *Mathematical modeling of prolonged SARS-CoV-2 infection*  
**Katherine Lacy Owens**, Fred Hutchinson Cancer Center (1203-92-43660)

9:00AM (10.3) *Mathematical models highlight the importance of effector cell function in the control of HIV-1*  
**Tin Phan**, Theoretical Biology and Biophysics, Los Alamos National Laboratory, **Jessica M Conway**, Penn State, **Nicole Pagane**, Massachusetts Institute of Technology, **Jasmine Kreig**, Los Alamos National Laboratory, **Narmada Sambaturu**, Los Alamos National Laboratory, **Sarafa Adewale Iyanwura**, Fred Hutchinson Cancer Center, **Jonathan Z Li**, Brigham and Women's Hospital,

Harvard Medical School, **Ruy M Ribeiro**, Theoretical Biology and Biophysics, Los Alamos National Laboratory, **Ruian Ke**, Los Alamos National Laboratory and **Alan S Perelson**, Theoretical Biology and Biophysics, Los Alamos National Laboratory (1203-92-41077)

9:30AM  
▶ (10.4) *Host-host interactions as drivers of virulence evolution in multi-host parasites*  
**Claire Evensen**<sup>\*</sup>, Department of Integrative Biology, University of California Berkeley, **Andy White**, Maxwell Institute for Mathematical Sciences, Heriot-Watt University, Edinburgh, UK and **Mike Boots**, Department of Integrative Biology, University of California Berkeley, CA (1203-92-41290)

10:00AM  
(10.5) *Efficient coupling of within- and between-host infectious disease dynamics*  
**Ben Ashby**<sup>\*</sup>, Simon Fraser University and **Cameron Smith**, University of Oxford (1203-92-42366)

10:30AM  
▶ (10.6) *Malaria parasite investment strategies with immune feedback*  
**Denis Patterson**<sup>\*</sup>, Durham University, **Lauren M Childs**, Department of Mathematics, Virginia Tech, United States of America, **Nakul Chitnis**, Department of Epidemiology & Public Health, Swiss Tropical and Public Health Institute and the University of Basel, **Megan A Greischar**, Cornell University, **Isaac Stopard**, Imperial College London and **Sergio Serrato-Arroyo**, Arizona State University (1203-92-42777)

11:00AM  
(10.7) *Scaling Complexity in Dynamical Systems for Malaria*  
**David L Smith**<sup>\*</sup>, University of Washington (1203-92-43431)

11:30AM  
▶ (10.8) *Stochastic model for cell population dynamics quantifies homeostasis in colonic crypts and its disruption in early tumorigenesis*  
**Konstantinos Mamis**<sup>\*</sup>, University of Washington, Applied Math Department (1203-92-44356)

### ***(11) AMS Special Session on Exploring Dynamics and Bifurcation Analysis of Discrete Dynamical Systems in Mathematical Biology, I***

**WEDNESDAY, JANUARY 08 8:00AM–11:00AM 310, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Toufik Khyat**, Rider University  
**Arzu Bilgin**, Recep Tayyip Erdogan University

8:00AM  
(11.1) *A computable criterion for the existence of homoclinic tangencies*  
**Brian A. Coomes**<sup>\*</sup>, University of Miami, Department of Mathematics (1203-65-44685)

8:30AM  
▶ (11.2) *An investigation of a discrete-time predator-prey model with stage structure in both species*  
**Md Istiaq Hossain**<sup>\*</sup>, Stephen F. Austin State University (1203-92-44686)

9:00AM  
▶ (11.3) *Dynamics of a plant-herbivore model subject to Allee effects with logistic growth of plant biomass*  
**Arzu Bilgin**<sup>\*</sup>, Recep Tayyip Erdogan University (1203-39-44978)

9:30AM  
(11.4) *The interplay between multiple control mechanisms in a host-parasitoid system: a discrete-time stage-structured modelling approach*  
**Jenita Jahangir**<sup>\*</sup>, University of Louisiana at Lafayette (1203-92-37672)

10:00AM  
▶ (11.5) *Exponential Decay for a Klein-Gordon-Schrödinger System with locally Distributed Damping*  
**Michael E. Filippakis**<sup>\*</sup>, Department of Digital Systems, University of Piraeus, Greece and **Marilena Poulou**, Department of Mechanical Engineering, Uniwa, Greece (1203-37-43049)

10:30AM  
▶ (11.6) *CANCELLED - Epidemiological Forecasting with Metapopulation Models: Integrating Stochastic Transmission Rates and Change-point Detection*  
**Avery Chawner Drennan**, Northern Arizona University, **Jaechoul Lee**, Northern Arizona University, **Andrew Attilio**, Northern Arizona University, **Jeffrey Moore Covington**, Northern Arizona University, **Dan Han**, University of Louisville, **Joseph R Mihaljevic**, Northern Arizona University, **Eck R Doerry**, Northern Arizona University, **Richard G Posner**, Northern Arizona University and **Ye Chen**<sup>\*</sup>, Northern Arizona University (1203-37-44365)

### ***(12) AMS Special Session on Generalized Derivatives: Analysis on Time Scales, Fractional Calculus, Difference Equations, and Others, I***

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 304, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Tom Cuchta**, Marshall University  
**Nick Wintz**, Lindenwood University

8:00AM  
▶ ♦ (12.1) *On Martínez-Kaabar Fractal-Fractional Calculus with Applications*  
**Prof. Mohammed K A Kaabar, PhD, FRSPH, FIMarEST**<sup>\*</sup>, Samarkand International University of Technology, Samarkand, Uzbekistan, Kaabar-Wang Tech Institute (KWTI), Samarkand, Uzbekistan (1203-45-38040)

8:30AM  
▶ (12.2) *Antidifferences of Functions on Arbitrary Discrete Time Scales*  
**Scott C. Gensler**<sup>\*</sup>, University of Nebraska-Kearney (1203-39-44382)

9:00AM  
(12.3) *Mathematical Analysis of Post-Treatment Control of HIV Infection*  
**Elvan Akin**<sup>\*</sup>, Missouri University S&T and **Neslihan Nesliye Pelen**, ONDOKUZ MAYIS UNIVERSITY (1203-37-45135)

9:30AM  
♦ (12.4) *Explicit and Implicit Finite Difference Methods and Global Stability Analysis for Discrete SIR Epidemic Models*

- Neslihan N Pelen**<sup>\*</sup>, Missouri University of Science and Technology and **Elvan Akin**, Missouri University S&T (1203-92-45163)
- 10:00AM  
▶ (12.5) *Modified SIR model on a time scale*  
**Gro Hovhannisyan**<sup>\*</sup>, Kent State University (1203-34-36881)
- 10:30AM  
(12.6) *Bounded point derivations and approximate derivatives*  
**Stephen Deterding**<sup>\*</sup>, Marshall University (1203-30-42112)
- 11:00AM  
(12.7) *Exploring Green's Functions for Sequential Nabla Fractional Differences with Differing Bases and Orders*  
**Ariel Setniker**<sup>\*</sup>, California State University Maritime (1203-39-45404)
- 11:30AM  
▶ (12.8) *The conformable information filter*  
**Nick Wintz**<sup>\*</sup>, Lindenwood University, **Sophia Hungerford**, Lindenwood University and **Joseph E Smith**, Lindenwood University (1203-93-43184)

***(13) AMS Special Session on Harnessing the Power of Mathematical Models to Understand Population Dynamics, Ecology, and Evolution, I***

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WEDNESDAY, JANUARY 08 8:00AM–12:00PM Skagit 4, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizer: **Lale Asik**, University of the Incarnate Word

- 8:00AM  
▶ (13.1) *Harnessing Seasonality: Enhancing Disease Control Strategies by Investigating Seasonal Disease Emergence in Stochastic Epidemic Models*  
**Mahmudul Bari Hridoy**<sup>\*</sup>, Texas Tech University and **Linda J Allen**, Texas Tech University (1203-92-43635)
- 8:30AM  
▶ (13.2) *Characterizing probabilities of outbreaks of dengue in central Argentina using a temperature-dependent stochastic model*  
**Morgan H Jackson**<sup>\*</sup>, Virginia Commonwealth University, **Elizabet L Estallo**, Instituto de Investigaciones Biológicas y Tecnológicas, CONICET-Universidad Nacional de Córdoba, Centro de Investigaciones Entomológicas de Córdoba, Córdoba, Argentina, **Cheng Ly**, Virginia Commonwealth University and **Michael A Robert**, Virginia Tech (1203-92-41636)
- 9:00AM  
▶ ◆ (13.3) *Once bitten, thrice shy: a generalized framework for incorporating mosquito blood-feeding processes into parasite transmission models*  
**Kyle Dahlin**<sup>\*</sup>, Virginia Tech, **Lauren M Childs**, Department of Mathematics, Virginia Tech, United States of America and **Michael A Robert**, Virginia Tech (1203-92-43427)
- 9:30AM  
▶ (13.4) *Investigating the impact of Long-COVID and other post-infection conditions on long-term infectious disease dynamics.*  
**Brendan Shrader**<sup>\*</sup>, University of Central Florida and **Zhisheng Shuai**, University of Central Florida (1203-92-42367)

- 10:00AM  
▶ (13.5) *Using Integral Projection Models to Understand How Amphibian Defense Strategies Against a Virulent Fungus Vary Among Host Life Stages*  
**Jordan Pellett**<sup>\*</sup>, University of Tennessee, Knoxville, **Olivia Prosper**, University of Tennessee, Knoxville, **E. Davis Carter**, Salisbury University, **Mathew J Gray**, University of Tennessee, Knoxville, **Cheryl Briggs**, University of California, Santa Barbara, **Kacie Ring**, University of California, Santa Barbara and **Mark Q Wilber**, University of Tennessee, Knoxville (1203-92-45456)
- 10:30AM  
▶ ◆ (13.6) *A Study On Tumor Evolution with Lotka-Volterra Ecology Models and a Game Theoretical Approach*  
**Alejandro Antonio Mayorga**<sup>\*</sup>, Western Connecticut State University, **Nathan Zhang**, Western Connecticut State University, **Ruby Zhao**, Western Connecticut State University, **Tong Liu**, Tsinghua University, **Yongzhong Zhao**, Frontage Labs and **Xiaodi Wang**, Western Connecticut State University (1203-92-43917)
- 11:00AM  
▶ (13.7) *Population Dynamics of Spermatogonial Stem Cells*  
**Frederick R Adler**, University of Utah, **James A Gagnon**, University of Utah, **Connor Ryan Shrader**<sup>\*</sup>, University of Utah, **Andrea L Sposato**, University of Utah and **Jenna M Weber**, University of Utah (1203-92-40921)
- 11:30AM  
▶ (13.8) *Phylogenomic inference and dating in the presence of gene duplication, loss, and conversion*  
**Brandon Jerome Legried**<sup>\*</sup>, Georgia Institute of Technology (1203-92-41741)

***(14) AMS Special Session on Knots, 3-manifolds, and Their Invariants, I***

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WEDNESDAY, JANUARY 08 8:00AM–12:00PM 617, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Kate Petersen**, University of Minnesota Duluth  
**Christine Ruey Shan Lee**, Texas State University  
**Shelly Harvey**, Rice University  
**Moshe Cohen**, State University of New York at New Paltz  
**Margaret I Doig**, Creighton University
- 8:00AM  
(14.1) *Systoles and cosmetic surgeries*  
**David Futer**<sup>\*</sup>, Temple University, **Jessica S. Purcell**, Monash University and **Saul Schleimer**, University of Warwick (1203-57-42824)
- 8:30AM  
▶ (14.2) *Mixed-platonic 3-manifolds*  
**Eric B. Chesebro**, University of Montana, **Michelle Chu**, University of Minnesota, **Jason DeBlois**<sup>\*</sup>, University of Pittsburgh, **Neil Hoffman**, University of Minnesota, Duluth, **Priyadip Mondal**, University of Pittsburgh and **Genevieve Walsh**, Tufts University (1203-57-44961)

- 9:00AM  
▶ (14.3) *A determinant formula of the Jones Polynomial for a family of braids*  
**Melody Molander\***, UC Santa Barbara, **Derya Asaner**, University of Illinois Urbana-Champaign, **Sanjay Kumar**, The University of California, Santa Barbara, **Andrew Pease**, University of North Carolina and **Anup Poudel**, The Ohio State University (1203-57-44097)
- 9:30AM  
▶ ♦ (14.4) *A parallel algorithm for the exact computation of the Jones polynomial*  
**Kasturi Barkatani\***, arizona state university and **Eleni Panagiotou**, Arizona State University (1203-57-44774)
- 10:00AM  
(14.5) *SSL\_n\$ skein modules and the quantum Frobenius*  
**Vijay Higgins\***, University of California, Los Angeles (1203-57-44250)
- 10:30AM  
(14.6) *Jones-Wenzl projectors and odd Khovanov homology*  
**Dean Spyropoulos\***, Michigan State University (1203-57-45282)
- 11:00AM  
(14.7) *Transverse invariant as Khovanov skein spectrum at its Extreme Alexander grading*  
**Adithyan Pandikkadan\***, Louisiana State University and **Nilangshu Bhattacharyya**, Louisiana State University (1203-54-44683)
- 11:30AM  
(14.8) *Botany Problems for Legendrian Links*  
**Patricia Cahn\***, Smith College, **Rima Chatterjee**, University of Cologne and **Vladimir Chernov**, Dartmouth College (1203-57-45551)

***(15) AMS Special Session on Mathematical Frontiers of Data Science for National Security, I***

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM Tahoma 1, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Marcus J Bishop**, National Security Agency  
**John Anthony Emanuello**, National Security Agency  
**R W R Darling**, National Security Agency

- 8:00AM  
▶ (15.1) *The problem of authenticity in data science for national security*  
**Marcus J Bishop\***, National Security Agency (1203-104-44406)
- 8:30AM  
▶ (15.2) *Integrating uncertainty quantification within information extraction for national security*  
**Frederick G Law\***, Lawrence Livermore National Laboratory, **Marcus J Bishop**, National Security Agency, **Nicholas Andrews**, Johns Hopkins University, **Adam R Walder**, Lawrence Livermore National Laboratory and **Timothy M La Fond**, Lawrence Livermore National Laboratory (1203-62-40482)
- 9:00AM  
▶ (15.3) *Recent advances in multi-authorship detection*  
**Alex Lu Beckwith\***, US Department of Defense (1203-68-45549)
- 9:30AM  
▶ (15.4) *Recent advances in the detection of machine-generated text*

**Rafael Rivera Soto\***, Lawrence Livermore National Laboratory (1203-68-45563)

- 10:00AM  
(15.5) *Condition-Aware Score Calibration for Speaker Verification*  
**Jonas Borgstrom\***, MIT Lincoln Laboratory (1203-60-40607)
- 10:30AM  
(15.6) *How to use sheaf toposes for structured temporal data*  
**Daniel Rosiak\***, National Institute of Standards and Technology (1203-18-44238)
- 11:00AM  
▶ (15.7) *Bayesian Modeling of Self-Exciting Marked Point Processes with Missing Histories*  
**James Derek Tucker\***, Sandia National Laboratories, **Lyndsay Shand**, Sandia National Laboratories and **John R Lewis**, Sandia National Laboratories (1203-62-39661)
- 11:30AM  
(15.8) *Understanding Generative AI Content with Embedding Models*  
**Tony Chiang\***, ARPA-H (1203-46-45327)

***(16) AMS Special Session on Mathematics of Knowledge Graphs: Theory and Application, I***

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM Tahoma 4, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Bill Kay**, Pacific Northwest National Laboratory  
**Patrick Mackey**, Pacific Northwest National Laboratory  
**Sinan G Aksoy**, Pacific Northwest National Laboratory

- 8:00AM  
▶ (16.1) *Analyzing Scientific Networks: Topological Cycles and Community Detection in Knowledge Evolution*  
**Frances Claire McConnell\***, Macalester College, **Gavin Engelstad**, Macalester College, **Lori Beth Ziegelmeier**, Macalester College, **Russell Funk**, University of Minnesota, **Jason Owen-Smith**, University of Michigan, **Lucia Luo**, Macalester College and **Ethan Scheelk**, Macalester College (1203-55-40817)
- 8:30AM  
▶ (16.2) *Gotta match 'em all: Solution diversification in graph matching matched filters*  
**Zhirui Li**, University of Maryland, College Park, **Ben Johnson**, Jataware Corp., **Daniel L Sussman**, Boston University, **Carey Priebe**, Johns Hopkins University and **Vince Lyzinski\***, University of Maryland, College Park (1203-05-42235)
- 9:00AM  
▶ (16.3) *Large-Scale Graphs in Microsoft AI: Theoretical and Practical Insights from Random Projections*  
**Tvrtko Tadić\***, Microsoft Search, Assistant and Intelligence, **Cassiano Becker**, Microsoft Search, Assistant and Intelligence and **Jennifer Neville**, Microsoft Research (1203-60-39649)
- 10:00AM  
▶ (16.4) *Mathematical Representations of Knowledge Hypergraphs*  
**Cliff Joslyn\***, Pacific Northwest National Laboratory (1203-05-44328)

10:30AM *Fully Ontologized Knowledge Hypergraph Sheaves*  
 ▶ (16.5) **Robert Ellis Green**<sup>\*</sup>, University At Albany State University of New York, Pacific Northwest National Laboratory, **Miguel R Lopez**, University of Pennsylvania, Pacific Northwest National Laboratory, **Cliff Joslyn**, Pacific Northwest National Laboratory, **Michael Robinson**, American University, **Tobias Hagge**, Pacific Northwest National Laboratory and **Gregory Henselman-Petrusek**, Pacific Northwest National Laboratory (1203-18-42382)

11:00AM *Title: Knowledge graphs, subgraph matching and active learning*  
 ▶ ♦ (16.6) **Andrea L Bertozzi**<sup>\*</sup>, UCLA (1203-05-41981)

**(17) AMS Special Session on New Trends in Lie Theory and Mathematical Physics, I**

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 606, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Juan J. Villarreal**, Virginia Commonwealth University  
**Marco Aldi**, Virginia Commonwealth University

8:00AM *Supersymmetric W-algebras and Free Field Realization*  
 (17.1) **Arim Song**<sup>\*</sup>, University of Denver, Seoul National University (1203-17-42645)

9:00AM *Extending the Lax type operator for finite  $SW$ -algebras*  
 (17.2) **Jonathan Scott Brown**<sup>\*</sup>, SUNY Oneonta (1203-17-36547)

10:00AM *Remarks on the conjectures of Capparelli, Meurman, Primc and Primc*  
 ▶ (17.3) **Shashank Kanade**<sup>\*</sup>, University of Denver, **Matthew C Russell**, Rutgers University, **Shunsuke Tsuchioka**, Tokyo Institute of Technology and **S. Ole Warnaar**, University of Queensland (1203-17-39662)

11:00AM *Fermions revisited*  
 (17.4) **Michael Penn**<sup>\*</sup>, Randolph College and **Antun Milas**, SUNY Albany (1203-17-43956)

**(18) AMS Special Session on Partition Theory and  $q$ -Series, I**

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM Tahoma 3, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Dennis Eichhorn**, University of California, Irvine  
**Brandt Kronholm**, University of Texas Rio Grande Valley  
**William Jonathan Keith**, Michigan Technological University

8:00AM  *$p(5n+4)$  Again*  
 ▶ (18.1) **George E. Andrews**<sup>\*</sup>, Pennsylvania State University (1203-11-44705)

8:30AM *Finding systems of functional equations for Andrews-Gordon type series*  
 ▶ (18.2) **Yalçın Can Kılıç**, Sabancı University and **Kagan Kursungoz**<sup>\*</sup>, Sabancı University (1203-05-43481)

9:00AM *On the  $k$ th smallest part of a partition into distinct parts*  
 (18.3) **Joseph Andrew Vandehey**<sup>\*</sup>, University of Texas at Tyler, **Rajat Gupta**, University of Texas at Tyler and **Noah Lebowitz-Lockard**, None (1203-11-44197)

9:30AM *Palindrome Partitions*  
 ▶ (18.4) **Karlee Westrem**<sup>\*</sup>, Michigan Technological University (1203-05-38280)

10:00AM *Partition identities, fixed perimeter analogues, and Beck-type companion identities*  
 ▶ (18.5) **Gabriel Paul Gray**, University of Dayton, **Emily Payne**, University of Texas Rio Grande Valley, **Holly Swisher**<sup>\*</sup>, Oregon State University and **Ren Watson**, University of Texas At Austin (1203-05-38982)

10:30AM *Combinatorial statistics witnessing an infinite family of congruences for a sum of partition functions.*  
 ♦ (18.6) **Jena Gregory**<sup>\*</sup>, University of Texas - Rio Grande Valley and **Brandt Kronholm**, University of Texas Rio Grande Valley (1203-11-42834)

11:00AM *Congruences in arithmetic progression for coefficients of Gaussian polynomials and crank statistics*  
 ▶ (18.7) **Joselyne Aniceto**<sup>\*</sup>, University of Texas - Rio Grande Valley (1203-05-40168)

11:30AM *Algebra of overpartitions*  
 ▶ (18.8) **Robert Schneider**<sup>\*</sup>, Michigan Technological University (1203-05-45550)

**(19) AMS Special Session on Polymath Jr REU Student Research Session, I**

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM Chelan 2, Level 2, Seattle Convention Center Arch at 800 Pike**

Organizers: **Zhanar Berikkyzy**, Fairfield University  
**Adam Sheffer**, Baruch College, CUNY  
**Steven Joel Miller**, Williams College

8:00AM *Theoretical Aspects of Nonlocal Models*  
 ▶ (19.1) **Zi Qian Chan**<sup>\*</sup>, The University of Cambridge (1203-45-45641)

8:30AM *Applied and Numerical Aspects of Nonlocal Initial Value Problems*  
 ▶ (19.2) **Dianlun Luo**<sup>\*</sup>, Columbia University and **Zhekai Liu**, Jilin University (1203-65-45187)

9:00AM *Generative machine learning models for data assimilation*  
 ▶ ♦ (19.3) **Ricardo Baptista**, Caltech, **Giulio Trigila**, Baruch College, **Tanya Wang**, New York University, **Virginia Do**, Haverford College, **Jeet Vashisht**, The University of North Carolina at Chapel Hill, **Bhargavi Patil**, Mount

Holyoke College, **Jenny Yang**, Bard College at Simon's Rock, **Xiaocen Liu**, University of Michigan, **Minsoo Park**, Columbia University, **Samadrita Bhattacharya**, Indian Statistical Institute, Bangalore Centre, **Pouria Salekani**, California State University, Northridge, **Aseel Kmail**, Arab American University and **Sam Hu**, Swarthmore College (1 203-68-45433)

9:30AM  
▶ (19.4)

*\textit{Assembly Lines}: A Game for Math Education*

**Luke Bridges**, Michigan State University and **Tarik Krestalica**, Southern New Hampshire University (1203-97-45484)

10:00AM  
▶ ◆ (19.5)

*Investigating Constructions of Macaulay Posets and Rings*

**Penelope Beall**, University of Florida, **Nancy Chen**, Cornell University, **Ellen Chlachidze**, University of Michigan and **Mitch Johnson**, Hamilton College (1203-06-38459)

10:30AM  
▶ (19.6)

*Infinite Skolem Sequences*

**Saad Mneimneh**, City University of New York, **Saman Farhat**, CUNY, **Paul Cesaretti**, CUNY, **Benjamin Garrett**, CUNY, **Ryan Vaz**, CUNY, **Ben Gildea**, UC Berkeley (undergraduate student), **Jack Rosenthal**, Princeton, **Aahan Chatterjee**, University of Waterloo, **Sambhu Ganesan**, Lynbrook High School, **Valentio Iverson**, University of Waterloo, **Luca Viscito**, Bennington College, **Yusheen Wang**, Bryn Mawr College and **David Phillips**, University of Pittsburgh (1203-40-40290)

11:00AM  
▶ ◆ (19.7)

*Quad Packing*

**Taiki Aiba**, Georgia Tech, **Dani Catala**, Massachusetts Institute of Technology, **Sarah Covey**, Harvey Mudd College and **Marcus Chung**, Amherst College (1203-102-40918)

11:30AM  
▶ (19.8)

*Weighted Lipschitz Graphs and Doubling Conditions in Bounded Regions*

**Walton Anderson**, University of Minnesota, **Adil Oryspayev**, Syracuse University and **Jaydan Herrera**, New Mexico Highlands University (1203-28-42128)

**(20) AMS Special Session on Recent Developments in Regularization Methods for Nonlinear Inverse Problems, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 210, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Otmar Scherzer**, University of Vienna

**Bernd Hofmann**, Chemnitz University of Technology

**Akhtar A. Khan**, Rochester Institute of Technology

8:00AM  
(20.1)

*Further studies on the degree of ill-posedness*

**Bernd Hofmann**, Chemnitz University of Technology (1203-65-41192)

8:30AM  
(20.2)

*Nonlinear variational regularization with oversmoothing penalty term*

**Robert Plato**, Department of Mathematics, University of Siegen, Germany (1203-65-39480)

9:00AM  
(20.3)

*An inertial Levenberg-Marquardt method for nonlinear inverse problems*

**Dirk A. Lorenz**, University of Bremen (1203-65-43328)

9:30AM  
(20.4)

*Rothe Method for Inverse Evolutionary Quasi-Variational-Hemivariational Inequalities*

**Ouayl Chadli**, Department of Mathematics and System Engineering, Florida Institute of Technology, Melbourne, Florida, USA (1203-35-43202)

10:00AM  
▶ (20.5)

*On Iteratively Regularized Optimization under Nonlinear Dynamics Constraints with Applications to Epidemiology*

**Alexandra B. Smirnova**, Georgia State University and **Hamed Karami**, Georgia State University (1203-65-43945)

10:30AM  
(20.6)

*Ill-posedness and regularization of the viscoelastic inverse problem*

**Anwesa Dey**, University of Utah, **Johann Rudi**, Virginia Tech and **Elena Cherkaev**, University of Utah (1203-49-43643)

11:00AM  
▶ (20.7)

*Cancer Detection via Electrical Impedance Tomography and Optimal Control of Elliptic PDEs*

**Ugur G. Abdulla**, Okinawa Institute of Science and Technology and **Jose Rodrigues**, Okinawa Institute of Science and Technology (1203-49-42105)

11:30AM  
▶ (20.8)

*Estimating Mean and Variance of Random Coefficients in Mixed Variational Problems with An Application to Stochastic Elasticity Imaging*

**Zi-Jia Gong**, Rochester Institute of Technology and **Akhtar A. Khan**, Rochester Institute of Technology (1203-49-45025)

**(21) AMS Special Session on Several Complex Variables, Partial Differential Equations, and CR Geometry, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 201, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Sean N. Curry**, Oklahoma State University

**Anne-Katrin Gallagher**, Gallagher Tool & Instrument, Redmond, WA

**Jiri Lebl**, Oklahoma State University

8:00AM  
(21.1)

*The Borel map for compact subset of  $\mathbb{C}^n$*

**Bernhard Lamel**, University of Vienna, **Paulo Cordaro**, Universidad de São Paulo and **Giuseppe Della Sala**, American University of Beirut (1203-32-40435)

8:30AM  
(21.2)

*A Formula for the Pluricomplex Green Function of the Bidisk with Two Poles*

**Jesse Hulse**, Syracuse University (1203-32-39994)

- 9:00AM (21.3) *Meromorphic Convexity on Stein Manifolds*  
**Blake J. Boudreaux**, University of Arkansas (1203-32-40899)
- 9:30AM *Problem Session*
- 10:00AM (21.5) *Projective invariance, essential norms and the Cauchy-Leray transform in one and several variables.*  
**Luke David Edholm**, University of Vienna (1203-32-43848)
- 10:30AM (21.6) *Asymptotics of Fubini-Study Currents for Sequences of Line Bundles*  
**Melody Wolff**, Syracuse University (1203-32-41505)
- 11:00AM (21.7) *Degree of Rational Proper Maps between Balls with Maximum Geometric Rank*  
**Abdullah Al Helal**, Oklahoma State University (1203-32-41507)
- 11:30AM (21.8) *Methods of Tanaka theory in the local geometry of  $\mathbb{S}^k$ -nondegenerate CR structures of hypersurface type*  
**Igor Zelenko**, Texas A&M University, **David Gamble Sykes**, Center for Complex Geometry, Institute for Basic Studies (IBS), Daejeon, South Korea. and **Stefano Marini**, University of Bari, Italy (1203-32-41625)

**(22) AMS Special Session on Spectral Theory of Ergodic Operators and Related Models, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 608, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Svetlana Jitomirskaya**, University of California, Berkeley  
**Netanel Levi**, UC Irvine  
**Matthew Powell**, Georgia Institute of Technology  
**Matthew Powell**, Georgia Institute of Technology

- 8:00AM ► (22.1) *Some results about behavior of the zeros of iterated derivatives of random polynomials*  
**Truong Vu**, University of Illinois (1203-60-43419)
- 8:30AM ► ◆ (22.2) *On the Ground State Energies of Discrete and Semiclassical Schrödinger Operators*  
**Isabel Detherage**, UC Berkeley, **Nikhil Srivastava**, UC Berkeley and **Zachary Stier**, UC Berkeley (1203-35-44201)
- 9:00AM (22.3) *Logarithmic Capacities of Rational Frequency Approximants for Almost Mathieu Operator*  
**Burak Hatinoğlu**, Michigan State University (1203-47-42067)
- 9:30AM *Break*
- 10:00AM (22.5) *Log-Holder continuity of the rotation number of the smooth circle cocycles*  
**Anton Gorodetski**, UC Irvine and **Victor Kleptsyn**, CNRS à l'Institut de Recherche Mathématique de Rennes (1203-37-42733)

- 10:30AM (22.6) *Limit theorems for non-stationary random matrix products*  
**Anton Gorodetski**, UC Irvine, **Victor Kleptsyn**, CNRS à l'Institut de Recherche Mathématique de Rennes and **Grigorii Monakov**, UC Irvine (1203-37-44224)
- 11:00AM (22.7) *Spectra of Schrödinger Operators over Mixing Dynamics*  
**Jacob D. Fillman**, Texas A&M University (1203-47-39725)
- 11:30AM (22.8) *Exotic Lyapunov Spectra*  
**Jairo Bochi**, Penn State University (1203-37-43385)

**(23) AMS Special Session on Theoretical and Numerical Aspects of Fractional and Nonlocal Models, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 203, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Animesh Biswas**, University of Nebraska-Lincoln  
**Qiao Zhuang**, University of Missouri-Kansas City  
**Nicole Buczkowski**, Worcester Polytechnic Institute

- 8:00AM ◆ (23.1) *Linearization and localization of nonlocal nonconvex functionals*  
**Tadele Mengesha**, University of Tennessee and **James M. Scott**, Columbia University (1203-45-45171)
- 8:30AM ◆ (23.2) *Harnack inequality and Schauder estimates for fractional elliptic equations in nondivergence form*  
**Pablo Raúl Stinga**, Iowa State University (1203-35-41695)
- 9:00AM (23.3) *A planar partitioning problem with nonlocal interactions*  
**Ihsan Topaloglu**, Virginia Commonwealth University (1203-49-42453)
- 9:30AM (23.4) *Nonlocal Equations on Compact Manifolds*  
**Shuai Jiang**, Sandia National Laboratories and **Christian Alexander Glusa**, Sandia National Laboratories (1203-65-45149)
- 10:00AM (23.5) *Nonlocal Biharmonic Operators*  
**Nicole Buczkowski**, Worcester Polytechnic Institute, **Mikil Foss**, University of Nebraska-Lincoln, **Michael L Parks**, Oak Ridge National Laboratory, **Petronela Radu**, University of Nebraska-Lincoln and **Jeremy Trageser**, Sandia National Laboratories (1203-45-43217)
- 10:30AM ◆ (23.6) *Aspects of Convergence of Nonlocal Operators to Classical Operators*  
**Nicole Buczkowski**, Worcester Polytechnic Institute, **Animesh Biswas**, Missouri State University and **Mikil Foss**, University of Nebraska-Lincoln (1203-45-45059)
- 11:00AM ► (23.7) *Binary phase-separation with four critical mechanisms*

**Melissa De Jesus**<sup>\*</sup>, Florida International University and **Ciprian G. Gal**, Florida International University (1203-26-45048)

11:30AM  
◆ (23.8) *Fourier continuation method for nonlocal boundary value problems*  
**Ilyas Mustapha**<sup>\*</sup>, Kansas State University (1203-45-40335)

**(24) AMS Special Session on Topological Data Analysis: Theory and Applications, I**

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**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 620, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Jose A. Velez-Marulanda**, Valdosta State University  
**Shaun Van Ault**, Valdosta State University

8:00AM  
▶ (24.1) *On the Local Behavior of Spaces of Aerial Natural Images: A Well Known Result from a Different Viewpoint*  
**Jordan Stanley Matuszewski**<sup>\*</sup>, CUNY Graduate Center (1203-00-45503)

8:30AM  
▶ (24.2) *Confidence regions for a persistence diagram of a single image with one or more loops*  
**Susan Glenn**<sup>\*</sup>, University of Wisconsin, Los Alamos National Laboratory, **Jessi Cisewski-Kehe**, University of Wisconsin, **Jun Zhu**, University of Wisconsin and **William M Bement**, University of Wisconsin (1203-62-36680)

9:00AM  
▶ (24.3) *Mapping spaces of persistence diagrams into Hilbert space with controlled distortion*  
**Atish J. Mitra**<sup>\*</sup>, Montana Tech (1203-51-37852)

9:30AM  
▶ (24.4) *Conditional Periodicity of Time Series Via Persistent Homology*  
**Elizabeth Thompson**<sup>\*</sup>, Washington State University and **Bala Krishnamoorthy**, Washington State University (1203-55-40588)

10:00AM  
(24.5) *Geometric Bounds for Persistence*  
**Baris Coskunuzer**<sup>\*</sup>, UT Dallas (1203-55-39528)

10:30AM  
▶ ◆ (24.6) *Understanding U.S. Racial Segregation Through Persistent Homology*  
**Ori Salim Friesen**<sup>\*</sup>, Macalester College and **Lori Beth Ziegelmeier**, Macalester College (1203-55-40107)

11:00AM  
▶ (24.7) *THE JORDAN TYPE OF A MULTIPARAMETER PERSISTENCE MODULE*  
**Calin Chindris**<sup>\*</sup>, University of Missouri (1203-16-45196)

**(25) AMS Special Session on Topological Machine Learning, I**

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**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 607, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Brett Jefferson**, Pacific Northwest National Laboratory  
**Emilie Purvine**, Pacific Northwest National Laboratory

**Branden Stone**, Georgia Tech Research Institute

**Stephen J Young**, Pacific Northwest National Laboratory

8:00AM  
(25.1) *Topological deep learning: The past, present, and future*  
**Guowei Wei**<sup>\*</sup>, Michigan State University (1203-55-38008)

8:30AM  
▶ (25.2) *Topological Contrastive Learning*  
**Yulia R. Gel**<sup>\*</sup>, Virginia Tech, **Yuzhou Chen**, University of California at Riverside and **Jose Frias**, UNAM (1203-62-41115)

9:00AM  
▶ (25.3) *HyperMagNet: A Magnetic Laplacian based Hypergraph Neural Network*  
**Tatyana Benko**<sup>\*</sup>, University of Oregon, **Martin Buck**, Tufts University, **Ilya Amburg**, Pacific Northwest National Laboratory, **Stephen J Young**, Pacific Northwest National Laboratory and **Sinan Aksoy**, Pacific Northwest National Laboratory (1203-68-43999)

9:30AM  
▶ (25.4) *Hierarchical Graph-Based Cellular Neural Networks*  
**Mathilde Papillon**<sup>\*</sup>, University of California Santa Barbara and **Nina Miolane**, UC Santa Barbara (1203-68-39407)

10:00AM  
▶ (25.5) *Persistence-Augmented Neural Networks*  
**Elena Xinyi Wang**<sup>\*</sup>, Michigan State University, **Dmitriy Morozov**, Lawrence Berkeley National Laboratory and **Arnur Nigmatov**, Lawrence Berkeley National Laboratory (1203-68-41891)

10:30AM  
▶ (25.6) *Sheaf Analysis of Network Data*  
**Riley Decker**<sup>\*</sup>, University at Albany, SUNY (1203-68-44614)

11:00AM  
(25.7) *Topological representations of neural dynamics for predictive and generative modeling*  
**Smita Krishnaswamy**<sup>\*</sup>, Yale (1203-68-42679)

11:30AM  
▶ (25.8) *The subspace of LLM tokens within a high dimensional latent space*  
**Michael Robinson**<sup>\*</sup>, American University (1203-57-39029)

**(26) AMS Special Session on Topological, Algebraic, and Geometric Methods for Safe, Robust, and Explainable Machine Learning, I**

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**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 613, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Tegan Emerson**, Pacific Northwest National Laboratory

**Tim Doster**, Pacific Northwest National Lab  
**Scott Mahan**, University of California, San Diego

**Sarah McGuire**, Michigan State University  
**Henry Kvinge**, Pacific Northwest National Laboratory

8:00AM  
◆ (26.1) *A Neural Net Model for Distillation with Weights Explained*

**Dr. Berfin Simsek, PhD\***, Flatiron Institute & NYU, **Johanni Brea**, EPFL and **Amire Bendjeddou**, EPFL (1203-82-45439)

8:30AM  
▶ (26.2) *Analysis of internal activations to indicate undesirable behaviors in large language models*

**Jonathan H Tu\***, Pacific Northwest National Laboratory (1203-68-41288)

9:00AM  
▶ (26.3) *Interpreting Neural Networks Trained on Combinatorial Data*

**Herman Chau\***, University of Washington (1203-68-41832)

9:30AM  
▶ (26.4) *Geometric guarantees for explainable data science*

**Vitaliy A Kurlin\***, University of Liverpool (UK) (1203-51-36844)

10:00AM *Break*

10:30AM  
▶ (26.6) *Diss-IECT: Dissecting Data with local Euler Characteristic Transforms*

**Bastian Rieck\***, University of Fribourg (1203-55-40295)

11:00AM  
▶ (26.7) *Modeling Many-to-Many Maps*

**Elizabeth Diane Coda\***, Pacific Northwest National Laboratory (PNNL), UC San Diego (1203-68-42370)

11:30AM  
▶ ♦ (26.8)  *$\mathcal{O}(k)$ -Equivariant Dimensionality Reduction on Stiefel Manifolds*

**Andrew Lee**, St. Thomas Aquinas College, **Harlin Lee\***, University of North Carolina at Chapel Hill, **Jose Perea**, Northeastern University, **Nikolas Schonsheck**, Rockefeller University and **Madeleine Weinstein**, University of Puget Sound (1203-55-39682)

### (27) AMS-SIMIODE Special Session on Modeling Matters in Teaching and Learning Differential Equations, I

WEDNESDAY, JANUARY 08 8:00AM–12:00PM Chelan 4, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Kyle T Allaire**, Worcester State University  
**Lisa Naples**, Fairfield University  
**Pushpi Paranamana**, Saint Mary's College  
**Brian Winkel**, SIMIODE

8:00AM  
▶ (27.1) *What's the Matter? A Practical, Painless way to Facilitate Student Projects in Differential Equations*

**Rebecca G Wahl\***, Butler University (1203-101-44850)

8:30AM  
▶ (27.2) *ODEs and the Flu*

**Therese Shelton\***, Southwestern University (1203-34-44672)

9:00AM  
▶ (27.3) *Earthquakes and Multi-story Buildings – Understanding Modes and Natural Frequencies*

**Lynn G Schreyer\***, Washington State University (1203-101-44256)

9:30AM  
▶ (27.4) *Using hands-on simulations to launch instruction about the use of differential equations to model an infectious disease*

**Elizabeth Arnold\***, Montana State University (1203-34-42478)

10:00AM  
▶ (27.5) *Public Health Policy Based on Modeling*

**Valipuram Manoranjan\***, Washington State University (1203-34-40864)

10:30AM  
▶ (27.6) *Incorporating SIMIODE Projects into a Mathematical Modeling Course*

**Michael A. Karls\***, Ball State University (1203-34-42121)

11:00AM  
▶ (27.7) *A Journey Through Air Under Gravity: Unveiling the Dynamics of the Flight of a Sponge Dart*

**Jean Marie Linhart\***, Central Washington University and **Peter Howard**, Texas A & M University (1203-34-38559)

11:30AM  
▶ (27.8) *Epidemiological Models of Problem Drinking*

**Michael Olinick\***, Middlebury College (1203-101-36675)

### (28) AWM Special Session on Women in Mathematical Biology, I

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 4C-1, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Christina Edholm**, Scripps College  
**Lihong Zhao, PhD**, Virginia Tech  
**Robyn Shuttleworth**, Altos Labs  
**Karin Leiderman**, University of North Carolina at Chapel Hill  
**Hwayeon Ryu**, Elon University

8:00AM  
(28.1) *Modeling mechanisms of microtubule dynamics and polarity in neurons*

**Anna C. Nelson\***, Duke University (1203-92-42254)

8:30AM  
▶ ♦ (28.2) *Stochastic Processes and its Application to the Quantification of Endosomal Escape*

**Keisha Cook\***, Clemson University (1203-92-42364)

9:00AM  
▶ (28.3) *Mathematical Modeling of Immune Response to SARS-CoV-2*

**Hwayeon Ryu\***, Elon University and **Ayesh Awad**, University of North Carolina at Chapel Hill (1203-92-41538)

9:30AM  
♦ (28.4) *Exploring Gustatory Cortex Decoding of Chemosensory and Thermosensory Oral Stimuli*

**Audrey Nash\***, Florida State University, **Roberto Vincis**, Department of Biological Science and Program in Neuroscience, **Tom Needham**, Florida State University, **Richard Bertram**, Florida State University, Department of Mathematics and **Martin Bauer**, Florida State University (1203-92-36718)

10:00AM  
▶ ♦ (28.5) *Multiscale Modeling to Understand Development of Shoot Apical Meristem*

**Weitao Chen**<sup>\*</sup>, University of California, Riverside (1203-92-45421)

**Florence Glanfield**<sup>\*</sup>, University of Alberta (1203-97-44408)

10:30AM  
▶ (28.6) *CANCELLED - Mathematical analysis of simple behavioral epidemic models*

**Leah Lejeune**<sup>\*</sup>, Virginia Tech, **Lauren M Childs**, Department of Mathematics, Virginia Tech, United States of America, **Omar Saucedo**, Virginia Tech and **Navid Ghaffar zadegan**, Virginia Tech (1203-92-41612)

11:00AM  
▶ (28.7) *CANCELLED - Estimation of age-stratified viral transmission rates*  
**Julie Spencer**<sup>\*</sup>, Los Alamos National Laboratory (1203-92-39222)

11:30AM  
▶ ◆ (28.8) *Comparing models of vector-borne and environmental transmission pathogens*  
**Elizabeth Brooke Haywood**<sup>\*</sup>, Florida State University and **Michael Cortez**, Florida State University (1203-92-43663)

### ***(29) CRM-PIMS-AARMS Special Session on Indigenous Voices in Mathematics, I***

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 615, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizer: **Kamuela E. Yong**, University of Hawai'i-West O'ahu

8:00AM  
▶ ◆ (29.1) *"Relating to and with Mathematics"*  
**Kori Czuy**<sup>\*</sup>, Indigenous Science Educator/Consultant (1203-97-41000)

8:30AM  
▶ ◆ (29.2) *Arapaho Mathematics in a Middle School STEM Classroom: Tipi Construction*  
**Iva Moss**<sup>\*</sup>, University of Idaho, Fort Washakie School (1203-101-41181)

9:00AM  
▶ ◆ (29.3) *Indigenous Math at Turtle Mountain College*  
**Danny Luecke**<sup>\*</sup>, Turtle Mountain College (1203-104-41187)

9:30AM  
▶ ◆ (29.4) *Neetut ni'ik'eh o'tag: Perceptions and uses of mathematics on the San Carlos Apache Reservation*  
**Philip Stevens**<sup>\*</sup>, University of Idaho (1203-104-43506)

10:00AM  
▶ ◆ (29.5) *Bridging Tradition and Mathematics: A Study of The Peach Stone Bowl Game*  
**Layne Burns**<sup>\*</sup>, First Nations University of Canada, University of Regina (1203-104-43676)

10:30AM  
▶ (29.6) *Grounding Euclid in Diné territory: tensions and dexterities of culture, language, and cognition in mathematics*  
**Jessica K Benally**<sup>\*</sup>, University of California, Berkeley (1203-97-45719)

11:00AM  
▶ ◆ (29.7) *Indigenous Math Contributions: Unveiling Architectural and Scientific Mastery*  
**Ty Fierce Gene Metteba**<sup>\*</sup>, Teachers College at Columbia University (1203-97-45343)

11:30AM  
▶ (29.8) *Weaving Indigenous Pedagogical Practices in Mathematics Education*

### ***Employment Center***

**WEDNESDAY, JANUARY 08 8:00AM–3:00PM Grand Ballroom AB, Second Floor, Sheraton Grand Seattle**

Organizers: **Kayla M. Roach**, American Mathematical Society  
**Hannah Ortiz**, American Mathematical Society

### ***(30) ILAS Special Session on Matrix Analysis and Applications, I***

**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 211, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Mohsen Aliabadi**, Iowa State University  
**Luyining Gan**, Beijing University of Posts and Telecommunications  
**Tin-Yau Tam**, University of Nevada Reno

8:00AM  
▶ ◆ (30.1) *Random permutations using GEPP*  
**John Peca-Medlin**<sup>\*</sup>, University of California, San Diego and **Chenyang Zhong**, Department of Statistics, Columbia University (1203-60-36987)

8:30AM  
(30.2) *Symmetric Tropical Rank 2 Matrices*  
**May Cai**, Georgia Institute of Technology, **Kisun Lee**<sup>\*</sup>, Clemson University and **Josephine Yu**, Georgia Institute of Technology (1203-05-36874)

9:00AM  
▶ ◆ (30.3) *The convex algebraic geometry of higher-rank numerical ranges*  
**Jonathan A Nino-Cortes**<sup>\*</sup>, University of Washington (1203-14-40030)

9:30AM  
(30.4) *Factorizations and The Copositive Range of Copositive Matrices*  
**Seong Jun Park**<sup>\*</sup>, ILASS5A and **Michael J. Tsatsomeros**, Washington State University (1203-15-41461)

10:00AM  
▶ (30.5) *A new class of distances on complex projective spaces*  
**Shmuel Friedland**<sup>\*</sup>, University of Illinois at Chicago (1203-15-38711)

10:30AM  
▶ (30.6) *Simultaneous decomposition of quaternion matrices and its application in image processing*  
**Jie Tian**<sup>\*</sup>, University of Nevada, Reno (1203-15-40373)

11:00AM  
◆ (30.7) *Power means with near-order and their applications*  
**Sejong Kim**<sup>\*</sup>, Chungbuk National University (1203-15-38059)

11:30AM  
▶ (30.8) *New Eigenvalue Bound for the Fractional Chromatic Number*  
**Krystal Guo**, University of Amsterdam, Korteweg-de Vries Institute and **Sam Spiro**<sup>\*</sup>, Rutgers University (1203-05-36537)

**(31) ILAS Special Session on Strong Properties of Matrix Classes, I**

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**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 204, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Minerva Catral**, Xavier University  
**Bryan L Shader**, University of Wyoming

8:00AM (31.1) *A practical introduction to the strong properties in the IEP-G*  
**Veronika Furst**<sup>\*</sup>, Fort Lewis College (1203-15-42168)

9:00AM ♦ (31.2) *Minimum Rank and Zero Forcing Parameters for Cobipartite Graphs*  
**Derek Young**<sup>\*</sup>, Mount Holyoke College and **Louis Deaett**, Quinnipiac University (1203-05-42663)

9:30AM (31.3) *Graph operations and barbell partitions*  
**Prateek Kumar Kumar Vishwakarma**<sup>\*</sup>, Indian Institute of Science (1203-05-40504)

10:00AM (31.4) *Digraphs with maximum stable nullity at most 1*  
**Marina Arav**<sup>\*</sup>, Georgia State University and **Hein Van der Holst**, Georgia State University (1203-05-44248)

10:30AM ► (31.5) *On the number of distinct eigenvalues of zero-nonzero matrix patterns*  
**Kevin Vander Meulen**<sup>\*</sup>, Redeemer University (1203-15-44160)

11:00AM ► (31.6) *CANCELLED On the Contiguousness of the Distinct Eigenvalues of a Graph*  
**Shaun M Fallat**<sup>\*</sup>, University of Regina (1203-15-40551)

11:30AM ► ♦ (31.7) *The relationship between the zero forcing number and independence number of cubic graphs.*  
**Houston Schuerger**, University of Texas Permian Basin, **Nathan Warnberg**, University of Wisconsin-La Crosse and **Michael Young**<sup>\*</sup>, Carnegie Mellon University (1203-05-42579)

**(32) MAA Special Session on Assessment Practices that Support Equity and Inclusion, I**

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**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 619, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Heather Smith Blake**, Davidson College  
**Jessica Oshaughnessy**, West Chester University  
**Andrew C Lee**, St. Thomas Aquinas College  
**Brittney Falahola**, Stephen F. Austin State University  
**Sheila Tabanli**, Rutgers University – New Brunswick.  
**Amanda Harsy Ramsay**, Lewis University  
**Amanda Harsy Ramsay**, Lewis University

8:00AM ► ♦ (32.1) *"The projects allow me to understand math and define it in my way"*

**Katrin Wehrheim**<sup>\*</sup>, free radical (1203-97-44846)

8:30AM ► ♦ (32.2) *Utilizing a Poster Project as an Assessment in an Introductory Abstract Algebra Course*  
**Jennifer Schaefer**<sup>\*</sup>, Dickinson College (1203-101-41599)

9:00AM ► (32.3) *Equitable assessment in an abstract algebra course: Pedagogical problem solving*  
**Hyman Bass**<sup>\*</sup>, University of Michigan (1203-97-40730)

9:30AM ► (32.4) *Fostering Inclusiveness in an Intro to Proofs Course*  
**Cory M. Johnson**<sup>\*</sup>, California State University, San Bernardino (1203-101-41736)

10:00AM ► (32.5) *Examining the Subtleties of Our Mathematical Practices to Better Our Assessments*  
**Jason K Belnap**<sup>\*</sup>, University of Wisconsin Oshkosh and **Amy Parrott**, University of Wisconsin Oshkosh (1203-101-42299)

10:30AM (32.6) *Using Corequisite Instruction in Calculus 1 to Increase Student Success*  
**Kristin A Camenga**<sup>\*</sup>, Juniata College (1203-97-42725)

11:00AM (32.7) *Balancing Assessment in an Integrated Calculus/Precalculus Course*  
**Ellen J Goldstein**<sup>\*</sup>, Boston College (1203-101-44497)

11:30AM ► (32.8) *Growth Based Assessments in First Semester Calculus for STEM and non-STEM Majors*  
**James S Rolf**<sup>\*</sup>, University of Virginia, **Daniel James**, University of Virginia, **Michelle Francis**, University of Virginia, **Dela Totonchi**, University of Virginia, **Joshua Davis**, University of Virginia, **Yoi Tibbetts**, University of Virginia and **Chris Hulleman**, University of Virginia (1203-101-43927)

**(33) NAM-SIAM-AMS Special Session on Quantitative Justice**

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**WEDNESDAY, JANUARY 08 8:00AM–12:00PM 3A, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Omayra Ortega**, Sonoma State University  
**Robin T Wilson**, Loyola Marymount University  
**Ranthy Clark**, Duke University  
**Ron Buckmire**, Occidental College

8:00AM ► ♦ (33.1) *An Introduction to Quantitative Justice in Mathematics Research and Teaching Communities*  
**Ranthy A Clark**<sup>\*</sup>, Duke University, **Robin Wilson**, California State Polytechnic University, Pomona, **Omayra Ortega**, Sonoma State University and **Ron Buckmire**, Occidental College (1203-104-45521)

8:30AM ► (33.2) *Never Again: Machine Learning, Networks, and Data Storytelling in Genocide Prevention*  
**Victor I Piercey**<sup>\*</sup>, Ferris State University (1203-104-43389)

- 9:00AM  
(33.3) *Towards a Data Science Approach to Housing Justice*  
**Rebecca Hardenbrook\***, Dartmouth College (1203-104-45609)
- 9:30AM  
◆ (33.4) *Exploring Topics of Social Justice in a Quantitative Literacy Course for non-STEM Majors*  
**Christina Eubanks-Turner\***, Loyola Marymount University (1203-101-45768)
- 10:00AM  
▶ ◆ (33.5) *Does Gender and Race Matter? Towards Fairness in Dialogue Systems*  
**Jamell Dacon\***, Morgan State University (1203-68-45787)
- 10:30AM  
▶ ◆ (33.6) *Evaluating Differences Between #BlackLivesMatter and #AllLivesMatter: Discourse and Interpretations*  
**Maia Powell\***, Colorado Governor's Office (1203-91-44578)
- 11:00AM  
▶ ◆ (33.7) *Data Science Tools for Community-Driven Police Accountability*  
**Ariana Mendible\***, Seattle University (1203-104-44022)
- 11:30AM  
▶ ◆ (33.8) *On the Efficiency of Spectral Clustering with Balance Constraints*  
**Ivan Ojeda-Ruiz\***, Texas State University (1203-65-44310)

**(34) SIAM Minisymposium on Computational Advances in Solving the Electronic Structure Problem for Complex Materials**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 2B, Level Two, Seattle Convention Center Arch at 705 Pike

- Organizers: **Vikram Gavini**, University of Michigan  
**Jin Qian**, Lawrence Berkeley Laboratory  
**James Chelikowsky**, University of Texas
- 8:00AM  
(34.1) *Current and Future Methods for Solving the Electronic Structure Problem for Complex Materials*  
**James Chelikowsky\***, University of Texas and **Jin Qian**, Lawrence Berkeley Laboratory (1203-81-42317)
- 8:30AM  
▶ (34.2) *Hybrid Density Functional Simulations Beyond 10,000 Atoms Made Practical*  
**Volker Blum\***, Duke University (1203-92-43867)
- 9:00AM  
▶ (34.3) *INQ: Reinventing the electronic-structure code*  
**Xavier Iago Andrade-Valencia\***, Lawrence Livermore National Laboratory, **Alfredo Correa**, Lawrence Livermore National Laboratory and **Tadashi Ogitsu**, Lawrence Livermore National Laboratory (1203-81-46064)
- 9:30AM  
(34.4) *Accurate and efficient order-N framework for hybrid DFT based ab initio molecular dynamics simulations of heterogeneous finite-gap condensed-phase systems*  
**Robert A. Distasio Jr.\***, Cornell University (1203-81-45482)

- 10:00AM *Break*
- 10:30AM  
▶ (34.6) *Universal machine-learning approach for approximating nonlocal functionals in electronic and classical density-functional theory*  
**Michelle Marie Kelley\***, Rensselaer Polytechnic Institute, **Joshua Quinton**, Rensselaer Polytechnic Institute, **Kamron Fazel**, Rensselaer Polytechnic Institute, **Nima Karimitari**, University of South Carolina, **Christopher Sutton**, University of South Carolina and **Ravishankar Sundararaman**, Rensselaer Polytechnic Institute (1203-81-41914)
- 11:00AM  
(34.7) *Static Subspace Approximation for Random Phase Approximation Correlation Energies: Implementation, Exascale Optimization and Application to Materials for Catalysis and Electrochemistry*  
**Mauro Del Ben\***, LBNL and **Daniel Weinberg**, LBNL (1203-81-43814)
- 11:30AM  
▶ ◆ (34.8) *Discovery and characterization of spin qubits in oxides from first principles*  
**Vrinda Somjit\***, Argonne National Laboratory, **Joel Davidsson**, Linköping University, **Yu Jin**, University of Chicago and **Giulia Galli**, University of Chicago and Argonne National Laboratory (1203-81-44480)

**(35) SLMATH (MSRI) Special Session on Metric Geometry and Topology, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 611, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Catherine Searle**, Wichita State University  
**Christine M. Escher**, Oregon State University
- 8:00AM  
(35.1) *Finite Diffeomorphism Theorem for manifolds with lower Ricci curvature and bounded energy*  
**Wenshuai Jiang**, Zhejiang University and **Guofang Wei\***, UC Santa Barbara (1203-53-39032)
- 8:30AM  
(35.2) *Riemannian Submersions Need Not Preserve Positive Intermediate Ricci Curvature*  
**Hasan M El-Hasan\***, University of California, Riverside, **Russell Phelan**, University of California, Riverside and **Frederick H Wilhelm**, University of California, Riverside (1203-53-39071)
- 9:00AM  
(35.3) *Positive scalar curvature metrics and aspherical summands*  
**Shuli Chen\***, The University of Chicago, **Jianchun Chu**, Peking University and **Jintian Zhu**, Westlake University (1203-53-40977)
- 9:30AM  
◆ (35.4) *Stability Theorems for Spheres*  
**Hunter Stuffebeam\***, The University of Pennsylvania (1203-53-41872)
- 10:00AM  
(35.5) *Isoperimetric profile function comparison with Integral Ricci Curvature*  
**Jihye Lee\***, University of California, Santa Barbara (1203-53-41934)

- 10:30AM *Torus stability and lower curvature bounds*  
 ▶ ◆ (35.6) **Sergio Zamora Barrera\***, Oregon State University (1203-53-42016)
- 11:00AM  *$\mathbb{Z}_2$ -TORUS ACTIONS ON POSITIVELY CURVED MANIFOLDS*  
 ◆ (35.7) **Farida Ghazawneh\***, Wichita State University (1203-53-42822)
- 11:30AM  *$\mathbb{Z}_2$ -torus actions, positive curvature, and the  $\mathbb{Z}_2$ -cohomology ring of fixed-point set components*  
 (35.8) **Austin Bosgraaf\***, Oregon State University (1203-53-42980)

**(36) TPSE Contributed Paper Session on Transformation Models for Inclusive Student Experiences, I**

WEDNESDAY, JANUARY 08 8:00AM–12:00PM 618, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Michael Dorff**, Brigham Young University  
**Abbe Herzig**, American Mathematical Society  
**Brigitte Lahme**, Sonoma State University  
**Luis Antonio Leyva**, Vanderbilt University-Peabody College of Education & Human Development  
**Omayra Ortega**, Sonoma State University  
**Aris Winger**, Georgia Gwinnett College  
**Ben Ford**, Sonoma State University

- 8:00AM *Combining AI and Analytics to Support Student Success*  
 ▶ (36.1) **Karishma Punwani\***, Maplesoft (1203-97-44494)
- 8:30AM *From Circle time to prime time*  
 ▶ (36.2) **Nathan Gregory McNew\***, Towson University, **Michael O'Leary**, Towson University and **Alexei Kolesnikov**, Towson University (1203-101-44620)
- 9:00AM *A Framework for Equitable and Effective Teaching in Undergraduate STEM Education*  
 ▶ (36.3) **Cristina Villalobos\***, University of Texas Rio Grande Valley and **Sean P Yee**, University of South Carolina (1203-101-44295)
- 9:30AM *Centering Multilingual Students in Active Learning: Lessons Learned from Student Experiences in Undergraduate Mathematics Courses*  
 ▶ ◆ (36.4) **Ernesto Daniel Calleros\***, California State University Fresno and **Jocelyn Gonzales Rios**, University of Northern Colorado (1203-97-42745)
- 10:00AM *A Support Model for STEM Doctoral Candidates Teaching at HBCUs*  
 ◆ (36.5) **Jana Talley\***, Jackson State University, **Brenda Brand**, Virginia Polytechnic Institute and State University, **Ernst Jeremy**, Embry Riddle Aeronautical University, **Brandy Faulkner**, Virginia Polytechnic Institute and State University, **David Kniola**, Virginia Polytechnic Institute and State University, **Grace Ndirp**,

Virginia State University, **Willie Rockward**, Morgan State University and **Lezly Taylor**, Virginia Polytechnic Institute and State University (1203-103-45019)

- 10:30AM *TPSE Math COME-IN: a program to make mathematics more accessible for all students*  
 ▶ (36.6) **Michael Dorff\***, Brigham Young University, **Abbe Herzig**, TPSE-Math, **Aris Winger**, Georgia Gwinnett College and **Scott Andrew Wolpert**, University of Maryland and TPSE Math (1203-103-45131)
- 11:00AM *The Mathematical Self-Efficacy of Deaf/Hard-of-Hearing Students: A Narrative Approach*  
 ▶ ◆ (36.7) **Blake Nelson\***, Washington State University (1203-104-41484)

**(37) AIM Special Session on Math Circles for Makers, Creators, and Artists, I**

WEDNESDAY, JANUARY 08 8:30AM–12:00PM 3B, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Tom G. Stojsavljevic**, Beloit College  
**Gabriella A. Pinter**, University of Wisconsin, Milwaukee  
**Jeffrey Musyt**, Slippery Rock University  
**A. Gwinn Royal**, Ivy Tech Community College  
**Lauren L Rose**, Association for Women in Mathematics  
**Nikolas Rauh**, Seattle Universal Math Museum

- 8:30AM *Designing variations of a logic game*  
 ▶ (37.1) **Agnes Tuska\***, California State University, Fresno and **Andras G Benedek**, Inst. of Philosophy, HUN-REN Humanities Research Center (1203-97-43276)
- 9:00AM *The Game of Tones: Ratios, Music, and the First Impossibility Theorem*  
 ▶ (37.2) **Jeff Suzuki\***, Brooklyn College (1203-101-41699)
- 9:30AM *Mathematical Comic-Making*  
 ▶ ◆ (37.3) **Asmita Sodhi\***, University of Victoria (1203-102-44918)
- 10:00AM *Break*
- 10:30AM *Exploring Frieze Patterns Through Dance, Ceramics, and Architecture*  
 ▶ (37.5) **Malcolm Gabbard\***, Kansas State University (1203-97-44639)
- 11:00AM *Art and the Fundamental Theorem of Arithmetic*  
 ▶ (37.6) **Jeffrey Musyt\***, Slippery Rock University (1203-101-45389)
- 11:30AM *Tensegrity Polyhedra*  
 ▶ (37.7) **Nikolas Rauh\***, Seattle Universal Math Museum (1203-102-40586)

**(38) AMS Contributed Paper Session on Mathematics Education, I**

WEDNESDAY, JANUARY 08 8:30AM–11:45AM 307, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizer: **Brian D. Boe**, University of Georgia

8:30AM  
▶ ◆ (38.1) *Enhancing Mathematical Proof Comprehension:  
Key Elements of an Effective Active Reading  
Strategy*

**Eyob Demeke\***, California State University, Los  
Angeles (1203-97-38804)

9:00AM  
▶ (38.2) *How Different Computational Tools Influence  
Students' Mathematical Activities and  
Perceptions*

**Michael Foster\***, Rochester Institute of  
Technology, **Christian Cammarota**, Rochester  
Institute of Technology, **Ben Zwickl**, Rochester  
Institute of Technology and **Tony Wong**,  
Rochester Institute of Technology (1203-97-  
43496)

9:15AM  
▶ (38.3) *Using AI/Machine Learning to Optimize  
Resource Allocation in Undergraduate  
Mathematics/Statistics Courses*

**Shahab Abbaspour\***, Missouri State University  
and **Morgan C. Wang**, University of Central  
Florida (1203-97-44372)

9:30AM  
▶ (38.4) *Student-generated connections: Substitution  
equivalence and own equivalences*

**April Richardson\***, Oklahoma State University  
(1203-97-45458)

10:00AM  
▶ (38.5) *The Relevance of History in Mathematics  
Education: An Inquiry into the Aims,  
Methodologies, and Vision in Historical  
Mathematics Learning*

**Caden Scott Hildenbrand\***, George Fox  
University, **Sarah Kerrigan**, George Fox  
University and **Corban Harwood**, George Fox  
University (1203-97-45888)

10:15AM  
◆ (38.6) *How to Establish a Math Tutoring Center in  
Small Schools with a High Percentage of  
Underrepresented Students on a Tight Budget:  
Challenges and Solutions*

**Amineh Farzannia\***, Assistant Professor in  
residence, Connecticut (1203-97-42686)

10:30AM  
▶ (38.7) *The Impact of Blocked Practice versus Mixed  
Practice and the Strategy of Overlearning on  
Student Performance in Calculus*

**Nicholas Gorgievski\***, Bentley University and  
**Thomas C DeFranco**, University of  
Connecticut (1203-97-43820)

10:45AM  
▶ ◆ (38.8) *CANCELLED The Guided Reinvention of  
Equivalence Classes and Equivalence Relations*

**Kaitlyn Stephens Serbin\***, The University of  
Texas Rio Grande Valley, **Rosaura Uscanga**,  
Mercy University and **Tenchita Alzaga  
Elizondo**, University of Texas Rio Grande  
Valley (1203-97-45332)

11:15AM  
▶ ◆ (38.9) *One graduate students' experience teaching  
for the first time*

**Johan Benedict Arroyo Cristobal\***, University  
of Nebraska-Lincoln (1203-97-42705)

11:30AM  
▶ (38.10) *Eliminating The Achievement Gap: A  
Retrospective Analysis*

**Erik Wallace\***, Temple University (1203-97-  
45485)

### **AMS Panel: Challenges and Opportunities in Peer Review**

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WEDNESDAY, JANUARY 08 8:30AM–10:00AM 4C-3, Level Four,  
Seattle Convention Center Arch at  
705 Pike

Panelists will discuss the changing face of journal peer  
review in mathematics. Topics include: the increased  
difficulty of finding reviewers, whether the reward structure  
of academia is appropriate; plagiarism and unethical  
citation practices; the rise of formalization of proofs (using  
tools such as Lean); how important is journal peer review;  
to what extent is mathematics different from other  
disciplines; innovations in review practices.

Organizers: **Mark C. Wilson**, University of Massachusetts  
Amherst

**Igor Pak**, UCLA

**Lance Fortnow**, Illinois Institute of Technology

**Anne Schilling**, UC Davis

**Robert M Harington**, American Mathematical  
Society

### **(39) AMS Special Session on 35th Anniversary of AI and Math, I**

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WEDNESDAY, JANUARY 08 8:30AM–12:00PM Skagit 1, Lower  
Level, Seattle Convention Center  
Arch at 800 Pike

Organizers: **Frederick Hoffman**, Florida Atlantic University  
**Martin Charles Golumbic**, University of Haifa  
**Maria Provost**, Florida Atlantic University

8:30AM  
▶ (39.1) *35 Years of AI and Math*

**Martin Charles Golumbic\***, University of Haifa  
and **Frederick Hoffman**, Florida Atlantic  
University (1203-68-43918)

9:00AM  
▶ (39.2) *Bayesian Strategic Classification*

**Lee Cohen**, Stanford, **Saeed Sharifi-  
Malvajerdi\***, TTIC, **Kevin Stangl**, TTIC, **Ali  
Vakilian**, TTIC and **Juba Ziani**, Georgia Tech  
(1203-91-45239)

9:30AM  
▶ (39.3) *Economics and Computation: The Second  
Edition*

**Jorg Rothe\***, HHU Düsseldorf (1203-91-39597)

10:00AM  
▶ ◆ (39.4) *Automated Reasoning for the Discrete  
Mathematician*

**Bernardo Subercaseaux\***, Carnegie Mellon  
University (1203-68-42243)

10:30AM  
▶ (39.5) *Error-correcting codes, deep learning and  
machine learning interpretability*

**Gyorgy Turan\***, University of Illinois at Chicago  
and University of Szeged (1203-94-40828)

11:00AM  
▶ (39.6) *On the Stochastic Boolean Function Evaluation  
Evaluation Problem for Read-Once Formulas*

**Lisa Hellerstein\***, New York University (1203-  
68-44843)

11:30AM *Math + AI = AGI*  
▶ (39.7) **Sergei Gukov\***, California Institute of  
Technology (1203-00-43272)

**(40) AMS Special Session on Modeling Natural  
Resources, I**

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WEDNESDAY, JANUARY 08 8:30AM–12:00PM Skagit 2, Lower  
Level, Seattle Convention Center  
Arch at 800 Pike

Organizers: **Shandelle Henson**, Andrews University  
**Catherine A Roberts**, COMAP

8:30AM *{\it w}Stri spread dynamics in {\it Nilaparvata*  
▶ (40.1) *lugens} via discrete mathematical models*  
**Saber Elaydi\***, Trinity University, **Bo Zheng**,  
University of Guangzhou, **Huichao Yang**,  
University of Guangzhou and **Jianshe Yu**,  
University of Guangzhou (1203-39-41813)

9:00AM *A Stochastic Model for the Wolbachia Bacteria*  
▶ ◆ (40.2) **E. Kwessi\***, Trinity University (1203-92-40719)

9:30AM *Within-plant coexistence of viruses across*  
▶ (40.3) *nitrogen and phosphorus supply rates*  
**Yang Kuang\***, Arizona State University (1203-  
92-38229)

10:00AM *Multistage Spatial Model for Informing Release*  
▶ (40.4) *of Wolbachia-infected Mosquitoes as Disease*  
*Control*  
**Zhuolin Qu\***, University of Texas at San  
Antonio and **Tong Wu**, University of Texas at  
San Antonio (1203-92-38321)

10:30AM *Mathematical Modeling of Natural Resource*  
▶ ◆ (40.5) *and Human Interaction: Applications to the*  
*harvesting of Pacific Yew for cancer treatment*  
**Lucero Rodriguez Rodriguez**, Arizona State  
University, **Marisabel Rodriguez Messan**, U.S.  
Food and Drug Administration, **Komi Messan**,  
NIH and **Yun Kang\***, Arizona State University  
(1203-92-37681)

11:00AM *Cost Benefit Analysis of Solar Panels:*  
▶ ◆ (40.6) *Empowering students to make a difference*  
**Kris Mae Pasia\***, Bryn Mawr College, **Priita N**  
**Peterson**, Bryn Mawr College and **Victor J**  
**Donnay**, Bryn Mawr College (1203-104-43662)

11:30AM *CANCELLED A Comparative Analysis of Water*  
▶ (40.7) *Allocation Institutions and Economic Efficiency*  
**Joey Blumberg\***, US Forest Service (1203-91-  
38544)

**(41) AMS Special Session on Recent Advancements  
in the Numerical Analysis of Nonlinear Partial  
Differential Equations, I**

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WEDNESDAY, JANUARY 08 8:30AM–12:00PM 213, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Yi Zhang**, University of North Carolina at  
Greensboro

**Thomas Lee Lewis**, University of North  
Carolina at Greensboro

8:30AM *Solvers for the Fractional Fokker-Planck*  
▶ (41.1) *Equation with Singular Initial Conditions and*  
*Their Applications*

**Qihao Ye\***, University of California, San Diego,  
**Xiaochuan Tian**, University of California, San  
Diego, **Yuhua Zhu**, University of California,  
San Diego and **Dong Wang**, The Chinese  
University of Hong Kong, Shenzhen (1203-65-  
40635)

9:00AM *Multigrid preconditioning for discontinuous*  
(41.2) *Galerkin discretizations of an elliptic optimal*  
*control problem with a convection-dominated*  
*state equation*

**Sijing Liu\***, Worcester Polytechnic Institute and  
**Valeria Simoncini**, Alma Mater Studiorum  
Università di Bologna (1203-65-40658)

9:30AM *Some Recent Developments in Data*  
▶ (41.3) *Assimilation for Nonlinear PDEs*  
**Xiaobing Henry Feng\***, The University of  
Tennessee (1203-65-43343)

10:00AM *Continuous Data Assimilation and Long-time*  
(41.4) *Accuracy of a FEM for the Barotropic Vorticity*  
*Equation*

**Amanda Emily Diegel\***, Mississippi State  
(1203-65-40489)

10:30AM *TGPT-PINN: Nonlinear model reduction with*  
▶ (41.5) *transformed GPT-PINNs*

**Yajie Ji\***, University of Massachusetts,  
Dartmouth, Shanghai Jiao Tong University  
(1203-65-40984)

11:00AM *A Banach space formulation for the fully*  
◆ (41.6) *dynamic Navier--Stokes/Biot coupled problem*  
**Aashi Dalal\***, University of Pittsburgh (1203-  
65-40746)

11:30AM *Convergent Finite Difference Methods with*  
(41.7) *Higher Order Local Truncation Errors for*  
*Stationary Hamilton-Jacobi Equations*

**Thomas Lee Lewis**, University of North  
Carolina at Greensboro and **Xiaohuan Xue\***,  
University of North Carolina at Greensboro  
(1203-65-42059)

**JMM Panel on The Use of AI tools to Aid  
Mathematics Research**

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WEDNESDAY, JANUARY 08 8:30AM–10:00AM 4C-4, Level Four,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Swarat Chaudhari**, University of Texas at  
Austin

**Amitayush Thakur**, University of Texas at  
Austin

**Ayush Khaitan**, Rutgers University

**Alex Kontorovich**, Rutgers University

**Rishi Mehta**, Google

**Emily Wenger**, Meta AI

**Kaiyu Yang**, Meta

**MAA Workshop: Supercharging Math Instruction:  
A Practical Guide to Generative AI Applications**

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**WEDNESDAY, JANUARY 08 8:30AM–10:00AM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike**

Explore the integration of generative AI in math education, focusing on practical applications that enhance curriculum design and problem-solving. This hands-on workshop will cover the use of AI tools, such as ChatGPT, for creating dynamic assignments and facilitating an inclusive, engaging learning environment. Participants will develop AI-augmented educational materials, discuss the ethical dimensions of AI in the classroom and gain insights into preparing students for the AI-influenced future

Organizers: **Dr. Gizem Karaali**, Pomona College  
**Lewis D. Ludwig**, Denison University

***(42) AMS Contributed Paper Session on Probability Theory and Stochastic Processes***

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**WEDNESDAY, JANUARY 08 9:00AM–12:00PM 305, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 9:00AM  
▶ (42.1) *A Predictable Dance: Local Limit Theorems for Finitely Generated Abelian Groups*  
**Yutong Yan**<sup>\*</sup>, Colby College and **Evan Daniel Randles**, Colby College (1203-60-42162)
- 9:15AM  
(42.2) *Studies on Convolution of Probabilities on Random Matrices*  
**Santanu Chakraborty**<sup>\*</sup>, University of Texas Rio Grande valley (1203-60-43538)
- 9:30AM  
▶ (42.3) *Random Subwords and Pipe Dreams*  
**Colin Defant**<sup>\*</sup>, Harvard University (1203-60-39679)
- 9:45AM  
▶ (42.4) *Asymptotic Properties of the Square Root Transformation of the Gamma Distribution*  
**Kimihiko Noguchi**, Western Washington University and **Mayla Ward**<sup>\*</sup>, Western Washington University (1203-60-44779)
- 10:00AM  
▶ (42.5) *CANCELLED Multiscaling limit theorems for stochastic FPDE with cyclic long-range dependence*  
**Andriy Olenko**<sup>\*</sup>, La Trobe University, Australia, **Maha Alghamdi**, La Trobe University, Australia and **Nikolai Leonenko**, Cardiff University, UK (1203-60-42785)
- 10:15AM  
▶ (42.6) *Applications of Benford's Principle Generalized to Geospatial and Social Network Investigations*  
**Timothy Tarter**<sup>\*</sup>, Author (1203-60-45334)
- 10:30AM  
◆ (42.7) *Analysis of the transition probability density function for an atmospheric forcing process in a climate change model*  
**Olusegun M. Otunuga**<sup>\*</sup>, Augusta University (1203-60-38205)
- 10:45AM  
(42.8) *Density-valued solutions of the Boltzmann-Enskog process*  
**Christian Ennis**<sup>\*</sup>, Louisiana State University (1203-60-44483)

11:00AM  
▶ ◆ (42.9) *Fractional Nonlocal Operators and Their Role in Superdiffusion on Lattices*  
**Dan Han**<sup>\*</sup>, University of Louisville (1203-60-39802)

11:15AM  
▶ (42.10) *A Spatially-Explicit Stochastic Model for the Gulf Coast Ticks*  
**Dr. Sankar Sikder**<sup>\*</sup>, Augusta University, **Azmy S Ackleh**, University of Louisiana at Lafayette and **Amy Veprauskas**, University of Louisiana at Lafayette (1203-60-43780)

11:30AM  
◆ (42.11) *On Some Mixing Properties Of Copula-Based Markov Chains*  
**Martial Longla**, University of Mississippi and **Mous-Abou Hamadou**<sup>\*</sup>, University of Mississippi (1203-60-42442)

11:45AM  
(42.12) *Heat kernel estimates on glued graphs*  
**Emily S Dautenhahn**<sup>\*</sup>, Murray State University and **Laurent Saloff-Coste**, Cornell University (1203-60-43156)

***(43) AMS Special Session on Applied Category Theory, I***

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**WEDNESDAY, JANUARY 08 9:00AM–12:00PM Yakima 2, Level 1, Seattle Convention Center Arch at 800 Pike**

- Organizers: **Evan Patterson**, Topos Institute  
**Nelson Niu**, University of Washington  
**Kristopher Brown**, Topos Institute  
**Priyaa Varshinee Srinivasan**, Topos Institute  
**Priyaa Varshinee Srinivasan**, Topos Institute
- 9:00AM  
(43.1) *A categorical approach to Lyapunov stability*  
**Joe Moeller**<sup>\*</sup>, California Institute of Technology and **Aaron D. Ames**, California Institute of Technology (1203-18-43745)
- 9:30AM  
▶ ◆ (43.2) *Some Results on Non-Hermitian Ribbon Fusion Categories*  
**Khyathi Komalan**<sup>\*</sup>, California Institute of Technology (Caltech) (1203-81-39490)
- 10:00AM  
▶ ◆ (43.3) *Applying Stochastic Attributed C-Set Rewriting in Agent-based Modeling in Public Health & Beyond*  
**John Carlos Baez**, U.C. Riverside, **Kristopher Brown**, Topos Institute, **Owen Haaga**, University of Oxford, **Xiaoyan Li**<sup>\*</sup>, University of Saskatchewan, **Nathaniel D. Osgood**, University of Saskatchewan and **Evan Patterson**, Topos Institute (1203-93-41221)
- 10:30AM  
▶ (43.4) *CatColab: A category-theoretic environment for collaborative modeling*  
**Evan Patterson**<sup>\*</sup>, Topos Institute (1203-18-44136)
- 11:00AM  
◆ (43.5) *Enriched Grothendieck topologies under change of base*  
**Ariel Rosenfield**<sup>\*</sup>, UC Irvine (1203-18-41778)
- 11:30AM  
(43.6) *(Higher) Categorical Galois Theory for the Working Mathematician*  
**Robert J Rennie**<sup>\*</sup>, Colorado College (1203-18-44801)

**(44) AMS Special Session on Research from the Graduate Research Workshop in Combinatorics, I**

**WEDNESDAY, JANUARY 08 9:00AM–12:00PM Tahoma 5, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Steve Butler**, Iowa State University  
**Puck Rombach**, University of Vermont

- 9:00AM *The Graduate Research Workshop in Combinatorics (GRWC): An Overview*
- 9:30AM *Counting Tangled Labelings*  
▶ (44.2) **Jamie Kimble**, Michigan State University, **Margaret M. Bayer**, University of Kansas, **Herman Chau**, University of Washington, **Owen Goff**, University of Wisconsin - Madison, **Yi-Lin Lee**, Indiana University, **Jinting Liang**, Michigan State University and **Mark Edward Denker**, University of Kansas (1203-05-40447)
- 10:00AM *Work towards finding a bijection from maximal identity Deograms to rational Dyck paths*  
▶ (44.3) **Garrett Nelson**, Kansas State University (1203-05-41617)
- 10:30AM *Sampling planar tanglegrams and pairs of disjoint triangulations*  
(44.4) **Alexander Black**, UC Davis, **Kevin Liu**, University of Washington, **Alex McDonough**, UC Davis, **Garrett Nelson**, Kansas State University, **Michael C. Wigal**, University of Illinois at Urbana-Champaign, **Mei Yin**, University of Denver and **Youngho Yoo**, Texas A&M University (1203-05-41454)
- 11:00AM *Combinatorics of generalized parking-function polytopes*  
(44.5) **Margaret M. Bayer**, University of Kansas, **Steffen Borgwardt**, University of Colorado Denver, **Teressa Chambers**, Brown University, **Spencer Daugherty**, University of Colorado Boulder, **Aleyah Dawkins**, George Mason University, **Danai Deligeorgaki**, KTH Royal Institute of Technology, **Hsin-Chieh Liao**, University of Miami, **Tyrrell B. McAllister**, University of Wyoming Laramie, **Angela Rose Morrison**, University of Colorado Denver, **Garrett Nelson**, Kansas State University and **Andres R. Vindas-Melendez**, Harvey Mudd College (1203-05-41760)
- 11:30AM *A Probabilistic Parking Process*  
▶ ♦ (44.6) **Amanda Priestley**, The University of Texas at Austin, **Steve Butler**, Iowa State University, **Pamela Estephania Harris**, Williams College, **Juan Carlos Martinez Mori**, Cornell University, **Thiago Holleben**, Dalhousie University, **Per Wagenius**, The University of Vermont and **Keith Sullivan**, The University of Vermont (1203-60-42968)

**Association for Symbolic Logic Tutorial I: Tropical geometry, logarithmic limits and o-minimality**

**WEDNESDAY, JANUARY 08 9:00AM–10:00AM 2A, Level Two, Seattle Convention Center Arch at 705 Pike**

The ASL Tutorial showcases interactions and connections between logic and other areas of mathematics. The two lecture tutorial is aimed at wide audience of mathematicians and does not assume technical background knowledge in logic.

Organizers: **David Reed Solomon**, University of Connecticut  
**Sergei Starchenko**, University of Notre Dame

**Professional Enhancement Program (PEP) 5A: Quantum-Accelerated Supercomputing for the Mathematics Classroom**

**WEDNESDAY, JANUARY 08 9:00AM–11:00AM Willow A, Second Floor, Sheraton Grand Seattle**

Organizer: **Monica VanDieren**, NVIDIA

**(45) SIGMAA Special Session on Mathematics and the Arts, I**

**WEDNESDAY, JANUARY 08 9:00AM–12:00PM 610, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Doug Norton**, Villanova University  
**Karl M Kattchee**, University of Wisconsin-La Crosse  
**Anil Venkatesh**, Adelphi University

- 9:00AM *Music Analysis and Synthesis*  
▶ (45.1) **John Leo**, Halfaya Research (1203-03-40900)
- 9:30AM *CANCELLED - Mathematical Modeling of Music: Parameterized Motifs and Hierarchical Structures in Composition*  
▶ (45.2) **Jeff Flaster**, Melodic Music LLC (1203-104-40739)
- 10:00AM *Mozart's Dice Game*  
▶ (45.3) **Edward Charles Keppelmann**, University of Nevada Reno (1203-101-43087)
- 10:30AM *Custom Casts Showcasing a Voronoi Pattern*  
▶ (45.4) **Mili Shah**, The Cooper Union, **Ayushi Bhattacharjee**, The Cooper Union, **Jennifer Weiser**, The Cooper Union, **Kayla Lee**, The Cooper Union and **Sabrina Zhou**, The Cooper Union (1203-104-44852)
- 11:00AM *Spirals and Polyhedral Lattice Paths: Where are the Prime Locations?*  
▶ (45.5) **Dan Bach, MA - UC Berkeley**, Dansmath.Com (1203-104-44985)
- 11:30AM *Linear perspective on non-planar canvases*  
▶ (45.6) **Annalisa Crannell**, Franklin & Marshall College (1203-104-43516)

**(46) AMS Contributed Paper Session on Topology, I**

**WEDNESDAY, JANUARY 08 9:30AM–12:00PM 309, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 9:30AM *Bridges Between Laplacian Matrices and Knot Invariants*  
▶ (46.1)

**Joshua Joseph Krienke**<sup>\*</sup>, Bard College (1203-54-45463)

9:45AM  
▶ (46.2) *Multidimensional Scaling of Topological Summaries of Monoclonal Antibodies*  
**Melinda Kleczynski**<sup>\*</sup>, National Institute of Standards and Technology, **Christina Bergonzo**, National Institute of Standards and Technology and **Anthony Kearsley**, National Institute of Standards and Technology (1203-55-45397)

10:00AM  
(46.3) *The image of  $J$  in  $p$ -adic geometry*  
**Sanath Devalapurkar**<sup>\*</sup>, Harvard, **Arpon Raksit**, MIT, **Jeremy Hahn**, MIT and **Allen Yuan**, Columbia University (1203-55-42969)

10:15AM  
▶ (46.4) *Explaining Protein Stability Classifications using Topological Features*  
**Amish Mishra**<sup>\*</sup>, Taylor University (1203-55-38858)

10:30AM  
▶ (46.5) *Topological Data Analysis using Persistence Images for Comparing Agent-Based Models of Zebrafish Patterning*  
**Dhananjay Bhaskar**<sup>\*</sup>, School of Medicine, Yale University, School of Engineering, Brown University, **William Zhang**, Division of Applied Mathematics, Brown University, Operations Research Center, MIT, **Ezra Seidel**, Division of Applied Mathematics, Brown University, **Alexandria Volkening**, Purdue University, **Bjorn Sandstede**, Brown University and **Ian Y. Wong**, Brown University (1203-55-45716)

10:45AM  
(46.6) *Spectral Properties of the Algebraic Path Problem*  
**Kaelyn Sinclair Willingham**<sup>\*</sup>, University of Minnesota, **Russell Funk**, University of Minnesota and **Thomas Gebhart**, University of Minnesota (1203-55-45819)

11:00AM  
▶ ◆ (46.7) *Representation Stability of Vertical Configuration Spaces*  
**David Baron**<sup>\*</sup>, Williams College, **Chenglu Wang**, University of Pennsylvania and **Chunye Yang**, University of Michigan (1203-55-38084)

11:15AM  
▶ (46.8) *Geometric Data Science extends Topological Data Analysis*  
**Vitaliy A Kurlin**<sup>\*</sup>, University of Liverpool (UK) (1203-55-43303)

11:30AM  
(46.9) *CANCELLED Towards a free  $\mathbb{Z}_2$ -equivariant Hopf Ring*  
**Richard Wong**<sup>\*</sup>, Rice University (1203-55-44585)

### ***AMS Directors of Undergraduate Studies Focus Group***

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**WEDNESDAY, JANUARY 08 9:30AM–11:00AM Grand Ballroom D, Second Floor, Sheraton Grand Seattle**

For chairpersons, directors of undergraduate studies, and other departmental leaders, this event provides a venue in which to share ideas and concerns connected with the undergraduate mathematics experience. Those intending to participate are invited to email programs@ams.org by December 4, 2024 (subject line: DUS Focus Group) to be

placed on the contact list for this event and to send any questions or topics they would like to be discussed.

Organizers: **Tyler Kloefkorn**, American Mathematical Society

**Sarah Bryant**, American Mathematical Society

**Kayla M. Roach**, American Mathematical Society

**Sarah Bryant**, American Mathematical Society

### ***(47) AMS John von Neumann Lecture - Lester Mackey, Stanford University***

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**WEDNESDAY, JANUARY 08 9:40AM–10:45AM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

9:40AM  
▶ (47.1) *Stein's Method, Learning, and Inference*  
**Lester Mackey**<sup>\*</sup>, Stanford University (1203-65-36452)

### ***(48) AMS Contributed Paper Session on Linear and Multilinear Algebra***

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**WEDNESDAY, JANUARY 08 10:00AM–12:00PM 306, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

10:00AM  
▶ (48.1) *On the Laplacian spectrum of  $k$ -uniform hypergraphs*  
**Shib Sankar Saha**<sup>\*</sup>, Indian Institute of Technology of Kharagpur, **Kshitij Sharma**, Indian Institute of Technology of Kharagpur and **Sawrup Kumar Panda**, Indian Institute of Technology of Kharagpur (1203-15-39259)

10:15AM  
(48.2) *Consensus Dynamics in Multiagent Systems Using Mathematical and Computational Simulations*  
**Sungjoon Park**, Phillips Academy Andover and **Richard Kyung**<sup>\*</sup>, CRG-NJ (1203-15-42655)

10:30AM  
(48.3) *Completeness theorem for the root vector system of infinite dimensional Hamiltonian operator*  
**Tin-Yau Tam**<sup>\*</sup>, University of Nevada, Reno (1203-15-41873)

10:45AM  
(48.4) *Properties of Clifford multiplication on 2-torsion points of spinor Abelian varieties*  
**Jennifer Anne Brown**<sup>\*</sup>, California State University Channel Islands, **Ivona Grzegorczyk**, California State University Channel Islands and **Ricardo Benjamin Suarez**, California State University Channel Islands (1203-15-45096)

11:00AM  
▶ (48.5) *A scalar matching factor on the Birkhoff polytope characterizing permutation and uniform matrices*  
**Suvadip Sana**<sup>\*</sup>, Cornell University (1203-15-39547)

11:15AM  
(48.6) *A random walk on the category of finite abelian  $p$ -groups*  
**Nikita Lvov**<sup>\*</sup>, McGill University (1203-15-45782)

### Community organizing as a mathematician

WEDNESDAY, JANUARY 08 10:30AM-12:00PM 400, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Padi Fuster Aguilera**, University of Colorado at Boulder  
**Abigail Taylor-Roth**, University of Chicago  
**Leah Leiner**, Temple University

### JMM Panel on The 1988-91 AMS "Computers and Mathematics" Initiative to Promote and Support the Use of Computers in Research & Education - And What Followed

WEDNESDAY, JANUARY 08 10:30AM-12:00PM 4C-3, Level Four, Seattle Convention Center Arch at 705 Pike

Moderators: **Keith J Devlin**, Stanford University  
**Keith J Devlin**, Stanford University  
**David H Bailey**, Lawrence Berkeley National Laboratory  
**Tevian Dray**, Oregon State University  
**Susanna Dodds Fishel**, Arizona State University  
**Tamara Munzner**, University of British Columbia  
**Paul Zorn**, St Olaf College

### JRMF Presents a Film: Counted Out: Math as Foundation for Life

WEDNESDAY, JANUARY 08 10:30AM-12:30PM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Daniel Kline**, Julia Robinson Mathematics Festival  
**Vicki Abeles**, Counted Out Film Director  
**Dan Finkel**, Math For Love  
**Vicki Abeles**, Counted Out Film Director  
**Karen Saxe**, American Mathematical Society  
**Jordan S Ellenberg**, University of Wisconsin-Madison  
**Talithia Williams**, Harvey Mudd College

### (49) AMS Erdős Lecture for Students - Kristin Lauter, Meta

WEDNESDAY, JANUARY 08 10:50AM-11:55AM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

10:50AM *AI for Crypto*  
► ◆ (49.1) **Kristin E. Lauter**, Meta AI (1203-68-44430)

### AMS - MAA Information Session on The Mathematical Education of Teachers III: What Knowledge and Skills Do Mathematics Teachers Need for the 21st Century?

WEDNESDAY, JANUARY 08 11:00AM-12:00PM 609, Level Six, Seattle Convention Center Arch at 705 Pike

The Writing Team for the Mathematics Education of Teachers III (MET III) will share themes of the proposed book to garner feedback. Slated for publication by the Conference Board of Mathematical Sciences in 2025, MET III will serve as a resource for those who teach mathematics and statistics to PreK-12 preservice and inservice mathematics teachers. MET III will also be a resource for state departments of education, higher education administrators, and other interested entities.

Organizers: **Marilyn E Strutchens**, Auburn University  
**W Gary Martin**, Auburn University  
**Yvonne Lai**, University of Nebraska Lincoln  
**Liz Arnold**, Montana State University  
**Cody L Patterson**, Texas State University  
**Ricardo Cortez**, Tulane University  
**Marilyn E Strutchens**, Auburn University

### JMM Networking Center - Skybridge

WEDNESDAY, JANUARY 08 12:00PM-5:30PM Hall 4D - Skybridge, Level Four, Seattle Convention Center Arch at 705 Pike

JMM Networking Center - Skybridge

Organizer: **AMS Meetings Department**, American Mathematical Society

### JMM Networking Center - Tahoma Foyer

WEDNESDAY, JANUARY 08 12:00PM-3:00PM Tahoma Foyer, Level Three, Seattle Convention Center Arch at 800 Pike

JMM Networking Center - Tahoma Foyer

Organizer: **AMS Meetings Department**, American Mathematical Society

### (50) AIM Special Session on Math Circles for Makers, Creators, and Artists, II

WEDNESDAY, JANUARY 08 1:00PM-5:00PM 3B, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Tom G. Stojsavljevic**, Beloit College  
**Gabriella A. Pinter**, University of Wisconsin, Milwaukee  
**A. Gwinn Royal**, Ivy Tech Community College  
**Lauren L Rose**, Association for Women in Mathematics  
**Nikolas Rauh**, Seattle Universal Math Museum

1:00PM  
► (50.1) *Math Meets Art: Rubik's Cube Mosaics*  
**Lauren L Rose**, Bard College and **A. Gwinn Royal**, Ivy Tech Community College (1203-102-45317)

1:30PM  
► (50.2) *Puzzles using Pattern Blocks*  
**Gabriella A. Pinter**, University of Wisconsin, Milwaukee and **Istvan G Lauko**, University of Wisconsin-Milwaukee (1203-102-44217)

- 2:00PM *Break*
- 2:30PM *Tangle Time: Graphs and Knots in a Math Circle. An activity for grade 3 to 7.*  
▶ (50.4) **Anna Burago**<sup>\*</sup>, Prime Factor Math Circle and **Luba Malkina**, Prime Factor Math Circle (1203-102-43214)
- 3:00PM *Sharing Chaos Game Fractals and Exploring Symmetry With Students*  
▶ (50.5) **Jim Anthony**<sup>\*</sup>, Slippery Rock University (1203-101-43806)
- 3:30PM *Break*
- 4:00PM *On Art-Math-Education Lessons in Polynomiography*  
▶ (50.7) **Bahman Kalantari**<sup>\*</sup>, Emeritus Professor of Computer Science, Rutgers University (1203-102-42874)
- 4:30PM *Fractals, Dots, and Blocks: Visual-Spatial Pathways to Sequences & Series*  
▶ (50.8) **Taylor Yeracaris**<sup>\*</sup>, Global Math Circle (1203-101-45598)

***(51) AMS Colloquium Lecture I - Svetlana Jitomirskaya, University of California, Berkeley***

**WEDNESDAY, JANUARY 08 1:00PM–2:05PM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM *Quantum mechanics meets arithmetics. The ten martini problem.*  
▶ (51.1) **Svetlana Jitomirskaya**<sup>\*</sup>, University of California, Berkeley (1203-82-36472)

***AMS Committee on Publications Panel Discussion: Artificial Intelligence and Publishing***

**WEDNESDAY, JANUARY 08 1:00PM–2:30PM 4C-3, Level Four, Seattle Convention Center Arch at 705 Pike**

This panel discussion will survey the effects of artificial intelligence on mathematical publishing, with an eye towards issues directly affecting AMS and its members.

Organizers: **Robert M Harington**, American Mathematical Society  
**Kiran Kedlaya**, University of California, San Diego  
**Kiran S Kedlaya**, University of California, San Diego  
**Robert M Harington**, American Mathematical Society  
**Michael Harris**, simon fraser  
**Emily Riehl**, Johns Hopkins University  
**Marc Strauss**

***(52) AMS Contributed Paper Session on Manifolds and Cell Complexes, and Global Analysis***

**WEDNESDAY, JANUARY 08 1:00PM–3:15PM 306, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM *On discrete gradient vector fields and Laplacians of simplicial complexes*  
◆ (52.1) **Andrew R Tawfeek**<sup>\*</sup>, University of Washington and **Ivan Contreras**, Amherst College (1203-57-36647)
- 1:15PM *Thompson's Groups, Annular Links, and Tangles*  
▶ (52.2) **Louisa Margaret Liles**<sup>\*</sup>, University of Virginia (1203-57-39387)
- 1:30PM *A Spectrum Connecting the Bridge Index and the Braid Index*  
▶ (52.3) **Chase Gehring**<sup>\*</sup>, Creighton University and **Margaret I Doig**, Creighton University (1203-57-43674)
- 1:45PM *CANCELLED Algorithmically Computing the Bridge Index of Spatial Graphs*  
▶ (52.4) **Puttipong Pongtanapaisan**<sup>\*</sup>, Arizona State University (1203-57-43751)
- 2:00PM *Equivariantly Double-Slice Knots*  
(52.5) **Malcolm Gabbard**<sup>\*</sup>, Kansas State University (1203-57-43982)
- 2:15PM *Unknotting moves for multiplane diagrams*  
▶ (52.6) **Roman Aranda**<sup>\*</sup>, University of Nebraska - Lincoln and **Carolyn Engelhardt**, University at Buffalo (1203-57-44279)
- 2:30PM *Root puzzles and plumbed 3-manifolds*  
(52.7) **Allison H Moore**<sup>\*</sup>, Virginia Commonwealth University and **Nicola Tarasca**, Virginia Commonwealth University (1203-57-39514)
- 2:45PM *An excision theorem in Heegaard Floer theory*  
(52.8) **Neda Bagherifard**<sup>\*</sup>, University of Oregon (1203-57-44206)
- 3:00PM *Symmetry groups of hyperbolic links and their complements.*  
▶ (52.9) **Christian Millichap**<sup>\*</sup>, Furman University and **Rolland Trapp**, California State University, San Bernardino (1203-57-38054)

***(53) AMS Contributed Paper Session on Mathematics Education, II***

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 307, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM *Blah Blah Blah: Understanding the Shift from Lecturing to Active Learning in Undergraduate Mathematics*  
▶ (53.1) **Cayla Bovell**, Denison University, **Eden Olivia Truax**<sup>\*</sup>, Ohio University and **Janelle A Thomas**, Wayne State University (1203-97-42955)
- 1:15PM *Analysis Paralysis: Modern Opportunities to Reconsider the Mathematics Curriculum at All Levels*  
▶ (53.2) **Daniel Havens**, Utah Valley University, **Wiktor Mogilski**, Utah Valley University, **Alan Reid**

- Parry**<sup>\*</sup>, Utah Valley University and **Joe Simons**, Utah Valley University (1203-97-42199)
- 1:30PM *Break*
- 1:45PM *Quantitative Reasoning in Ohio and Beyond*  
▶ (53.4) **Gregory D Foley**<sup>\*</sup>, Ohio University (1203-97-44872)
- 2:00PM *Lowering the DFW Rate in Calculus 1*  
▶ (53.5) **John Gruver**<sup>\*</sup>, Michigan Technological University and **Patrick McFall**, Michigan Technological University (1203-97-44909)
- 2:15PM *Effects of a Learning-Strategy Instruction Intervention on Growth Mindset and Self-Regulation in Introductory Mathematics Courses*  
▶ (53.6) **Katrina Nelson**<sup>\*</sup>, North Carolina A&T State University, **Sayed Mostafa**, North Carolina A&T State University, **Kalynda Smith**, North Carolina A&T State University and **Nicholas S Luke**, North Carolina A&T State University (1203-97-44704)
- 2:30PM *Investigating Roles of Proof: Perceptions of Pre-Service Secondary Mathematics Teachers*  
▶ (53.7) **Yi-Yin Ko**<sup>\*</sup>, Indiana State University, **Eliza Baker**, Indiana State University and **MaryPatricia Sill**, Indiana State University (1203-97-39793)
- 2:45PM *A Function-Based Approach to Simplify Geometry and Reduce Complex Calculations*  
▶ (53.8) **Amirhossein Zabeti**<sup>\*</sup>, Salam Highschool (1203-97-45793)
- 3:00PM *What is Proof? Perceptions of Instructors Teaching Transition-to-Proof Courses*  
▶ (53.9) **Eliza Baker**<sup>\*</sup>, Indiana State University, **Yi-Yin Ko**, Indiana State University and **MaryPatricia Sill**, Indiana State University (1203-97-40340)
- 3:30PM *Students' Conceptualization of the Non-Uniqueness of Decimal Representations of Numbers*  
▶ (53.10) **Niusha Modabbernia**<sup>\*</sup>, Simon Fraser University and **Gleb Glebov**, Simon Fraser University (1203-97-45746)
- 3:45PM *Improving perception of math through summer camps*  
▶ (53.11) **Marco Aldi**<sup>\*</sup>, Virginia Commonwealth University (1203-97-44588)
- 4:00PM *Inverse Problems in Linear Algebra Curriculum*  
▶ (53.12) **Anastasiia Minenkova**<sup>\*</sup>, University of Hartford (1203-15-39785)
- 4:15PM *Modeling Engagement and Motivation in Middle School Math Using Dynamical Systems*  
▶ (53.13) **Adrienne B. Spring**<sup>\*</sup>, Virginia Commonwealth University, **Bailey Bontrager**, Virginia Commonwealth University, **Visala Rani Satyam**, Virginia Commonwealth University, **Christine L. Bae**, Virginia Commonwealth University, **Marco Aldi**, Virginia Commonwealth University, **Allison H Moore**, Virginia Commonwealth University and **Nicola Tarasca**, Virginia Commonwealth University (1203-37-44780)

4:30PM *Project - based Learning in Linear Algebra and Abstract Algebra Classes*  
▶ (53.14) **Vesna Kilibarda**<sup>\*</sup>, Indiana University Northwest (1203-97-38966)

4:45PM *An Investigation of Students' Modes of Thinking Concerning Linearity in Linear Algebra*  
▶ (53.15) **Noa Levy**<sup>\*</sup>, University of Central Florida and **Katiuscia Teixeira**, University of Central Florida (1203-97-40876)

### **(54) AMS Contributed Paper Session on Number Theory and Field Theory, I**

**WEDNESDAY, JANUARY 08 1:00PM–3:15PM 305, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

1:00PM *Connected Components of the Generalized Divisor Function Twisted by a Character*  
▶ (54.1) **Sophie Zhu**<sup>\*</sup>, Harvard University (1203-11-42992)

1:15PM *SCHREIER MULTISSETS AND THE S-STEP FIBONACCI SEQUENCES*  
▶ ♦ (54.2) **Sindy Xin Zhang**<sup>\*</sup>, Tufts University (1203-11-38770)

1:30PM *Autocorrelations of the Thue-Morse Sequence*  
▶ (54.3) **Ari Gerald Pincus-Kazmar**<sup>\*</sup>, Macalester College and **Adam Stout**, Chico State University (1203-11-44691)

1:45PM *A Class of Polynomials from Enumerating Queen Paths*  
▶ (54.4) **Ashish Goswami**<sup>\*</sup>, Saratoga High School and **Khang Duc Tran**, California State University, Fresno (1203-11-39269)

2:00PM *Monogenic cyclic trinomials of the form  $x^4+cx+d$*   
(54.5) **Joshua Harrington**<sup>\*</sup>, Cedar Crest College and **Lenny Jones**, Shippensburg University (1203-11-41666)

2:15PM *A Pair of Diophantine Equations Involving the Fibonacci Numbers*  
▶ (54.6) **Liran Li**<sup>\*</sup>, Department of Mathematics, University of Virginia, **Dongho Tommy Kim**, Department of Mathematics, University of California, Berkeley, **Hung Viet Chu**, Department of Mathematics, Texas A&M University, **Xuyuan Chen**, Mathematical Sciences, Carnegie Mellon University, **Fadhlannafis K. Kesumajana**, Department of Mathematics, Institut Teknologi Bandung, **Steven Joel Miller**, Department of Mathematics and Statistics, Williams College, **Junchi Yang**, Department of Pure Mathematics, University of Waterloo and **Chris Yao**, Department of Mathematics, University of California, Berkeley (1203-11-40786)

2:30PM *On Rational 2-Periodic Points of Cubic Polynomials*  
▶ (54.7) **Chatchawan Panraksa**<sup>\*</sup>, Mahidol University International College, Mahidol University (1203-11-42181)

- 2:45PM *On solutions of  $\sum_{i=1}^n 1/x_i = 1$  in integers of the form  $2^a k^b$*   
 ▶ (54.8) **Joel Louwsma**<sup>\*</sup>, Niagara University (1203-11-42095)
- 3:00PM *New result on Waring numbers for diagonal congruences*  
 (54.9) **Kathryn Wilson**<sup>\*</sup>, Kansas State University (1203-11-44100)

**(55) AMS Contributed Paper Session on Topics in Algebra**

WEDNESDAY, JANUARY 08 1:00PM–3:45PM 302, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM *Finitistic dimension and singularity categories*  
 (55.1) **Souvik Dey**<sup>\*</sup>, Charles University, Prague and **Jan Šťovíček**, Charles University, Prague (1203-16-44202)
- 1:15PM *Leavitt Path Algebra of Kronecker Square of Quivers*  
 (55.2) **Jehan Alarfaj**<sup>\*</sup>, Saint Louis University, **Cody Gilbert**, Saint Louis University and **Ashish K. Srivastava**, Saint Louis University (1203-16-43426)
- 1:30PM *Fuchs' Problem for Quasidihedral Groups*  
 ▶ (55.3) **Brody Michael Miller**<sup>\*</sup>, Appalachian State University and **William J Cook**, Appalachian State University (1203-16-41618)
- 1:45PM *Strong  $\mathbb{S}$ -invariant for Complete Ultrametric Fields*  
 ◆ (55.4) **Shilpi Mandal**<sup>\*</sup>, Emory University (1203-16-43696)
- 2:00PM *On Representations Arising from Restricted Root Space Decompositions*  
 (55.5) **Jonathan Epstein**<sup>\*</sup>, McDaniel College (1203-17-45571)
- 2:15PM *Geometry, intersection, and complexity in the Dehn quandle of the torus*  
 ▶ (55.6) **Joel Zablow**<sup>\*</sup>, Brooklyn College CUNY (1203-17-40854)
- 2:30PM *Homomorphisms and Formations in Leibniz algebras*  
 ▶ (55.7) **Diego Castedo Pena**<sup>\*</sup>, North Carolina State University (1203-17-43759)
- 2:45PM *Boundary symmetries of  $(2+1)D$  topological orders*  
 (55.8) **Kylan Schatz**<sup>\*</sup>, North Carolina State University (1203-18-44515)
- 3:00PM *On tensor products of equivariant commutative operads*  
 (55.9) **Natalie Stewart**<sup>\*</sup>, Harvard (1203-18-42963)
- 3:15PM *Generalized mod 2 index in  $SKK$ -theory and an Atiyah type vanishing theorem*  
 (55.10) **Hao Zhuang**<sup>\*</sup>, Washington University in St. Louis (1203-19-43775)
- 3:30PM *Adams operations on compact Lie groups*  
 (55.11)

**Chi-Kwong Fok**<sup>\*</sup>, Xi'an Jiaotong-Liverpool University (1203-19-44611)

**(56) AMS Contributed Paper Session on Topology, II**

WEDNESDAY, JANUARY 08 1:00PM–4:00PM 309, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM *CANCELLED Parametrized cohomology*  
 (56.1) **Agnes Beaudry**<sup>\*</sup>, University of Colorado Boulder (1203-55-43934)
- 1:15PM *Homotopy Theory over  $\mathbb{F}_2$*   
 (56.2) **Jonathan Beardsley**<sup>\*</sup>, University of Nevada, Reno (1203-55-45083)
- 1:30PM *Equivariant Weiss Calculus*  
 (56.3) **Yang Hu**<sup>\*</sup>, New Mexico State University (1203-55-43105)
- 1:45PM *Homotopy Incoherent Norm Maps - Generalizing  $\mathbb{E}_k$ -operads*  
 (56.4) **Ben Szczesny**<sup>\*</sup>, Ohio State University (1203-55-43339)
- 2:00PM *CANCELLED Real equivariant cobordism spectra*  
 (56.5) **Yutao Liu**<sup>\*</sup>, University of Washington, **XiaoLin Danny Shi**, University of Washington and **Guoqi Yan**, University of Notre Dame (1203-55-44318)
- 2:15PM *Transfer systems: a Kaleidoscopic view*  
 ▶ (56.6) **Kyle Ormsby**<sup>\*</sup>, Reed College (1203-55-44368)
- 2:30PM *CANCELLED Multiplicative pairs of  $\mathbb{N}_\infty$ -operads*  
 ◆ (56.7) **Angelica M. Osorno**<sup>\*</sup>, Reed College (1203-55-45179)
- 2:45PM *Twisted Atiyah-Bott-Shapiro Maps*  
 (56.8) **Arun Debray**, University of Kentucky, **Cameron Krulewski**<sup>\*</sup>, Massachusetts Institute of Technology, **Natalia María Pacheco-Tallaj**, Massachusetts Institute of Technology and **Luuk Stehouwer**, Dalhousie University (1203-55-43109)
- 3:00PM *Applications of exodromy in topology*  
 (56.9) **Peter Haine**<sup>\*</sup>, Massachusetts Institute of Technology (1203-55-43689)
- 3:15PM *Topological Hochschild Homology with Coefficients*  
 (56.10) **Logan Radcliffe Hyslop**<sup>\*</sup>, University of California, Los Angeles (1203-55-43896)
- 3:30PM *Equivariant Simplicial Compression and Homology*  
 (56.11) **Christine M. Escher**, Oregon State University, **Chad Giusti**, Oregon State University and **Chung-Ping Lai**<sup>\*</sup>, Oregon State University (1203-55-41571)
- 3:45PM *Algebraically Closed Tambara Functors*  
 ▶ (56.12) **Jason Schuchardt**, UCLA, **Ben Spitz**<sup>\*</sup>, University of California Los Angeles and **Noah**

Wisdom, Northwestern University (1203-55-42804)

**(57) AMS Special Session on 35th Anniversary of AI and Math, II**

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**WEDNESDAY, JANUARY 08 1:00PM–5:00PM Skagit 1, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **Frederick Hoffman**, Florida Atlantic University  
**Martin Charles Golumbic**, University of Haifa  
**Maria Provost**, Florida Atlantic University

1:00PM  
▶ (57.1) *Digital Transformation of Mathematics. If? When? How?*  
**David Donoho**<sup>\*</sup>, Stanford University and **Matan Gavish**, Hebrew University of Jerusalem (1203-104-45478)

1:30PM  
▶ (57.2) *Second Order Regret Bounds for Contextual Bandits with Function Approximation*  
**Aldo Pacchiano**<sup>\*</sup>, Boston University (1203-62-45273)

2:00PM  
▶ (57.3) *Automated Identification of Cultural Norms Through Multimodal Extraction, Interpretation, and Knowledge Merging*  
**Leora Morgenstern**<sup>\*</sup>, SRI Future Concepts Division (formerly PARC) (1203-68-43254)

2:30PM  
▶ ♦ (57.4) *Visualizations of Search Behavior for Solving Constraint Satisfaction Problems*  
**Berthe Y. Choueiry**<sup>\*</sup>, University of Nebraska-Lincoln (1203-68-44861)

3:00PM  
▶ (57.5) *Advances in AI through Mathematical Formalization: From Human-Like Decision Making to Probabilistic Reasoning*  
**Kristen Brent Venable**<sup>\*</sup>, University of West Florida and IHMC (1203-68-43943)

3:30PM  
(57.6) *Meta Co-Training: Two Views are Better than One*  
**Jay C. Rothenberger**, The University of Oklahoma and **Dimitrios I. Diochnos**<sup>\*</sup>, The University of Oklahoma (1203-68-43963)

4:00PM  
(57.7) *Fast Rates in Pool-Based Batch Active Learning*  
**Claudio Gentile**<sup>\*</sup>, Google Research (1203-68-42461)

4:30PM  
(57.8) *Some thoughts on Math and AI*  
**Alex Kontorovich**<sup>\*</sup>, Rutgers University (1203-00-42311)

**(58) AMS Special Session on Advances in Function Theoretic Operator Theory, II**

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**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 205, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Raymond Cheng**, Old Dominion University  
**Christopher Felder**, Indiana University Bloomington

1:00PM  
(58.1) *Operator realizations of non-commutative functions*  
**Robert T.W. Martin**<sup>\*</sup>, University of Manitoba (1203-47-43812)

2:00PM  
(58.2) *Reproducing Kernel Hilbert Spaces and some applications*  
**J. E. Pascoe**<sup>\*</sup>, Drexel University (1203-46-45627)

3:00PM  
(58.3) *Surjective isometries of  $C^*$ -algebras*  
**Catherine Anne Beneteau**<sup>\*</sup>, University of South Florida (1203-47-43912)

3:30PM  
(58.4) *The Commutator of the Bergman Projection in the Two Weight Setting*  
**Nathan A. Wagner**<sup>\*</sup>, Brown University, **Bingyang Hu**, Auburn University, Auburn, AL and **Ji Li**, Macquarie University (1203-47-39879)

4:00PM  
(58.5) *Automorphisms of Principal Ideals within Corona-less Banach Function Algebras*  
**Douglas T. Pfeffer**<sup>\*</sup>, University of Tampa, **Meric Langston Augat**, James Madison University and **Benjamin P. Russo**, Riverside Research (1203-46-41994)

4:30PM  
(58.6) *Graphs and Pick functions in two variables*  
**Ryan K. Tully-Doyle**<sup>\*</sup>, Cal Poly SLO (1203-32-41697)

**(59) AMS Special Session on AI meets Cryptography, I**

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**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 612, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Shi Bai**, Florida Atlantic University  
**Emily Wenger**, Meta AI  
**Kristin E. Lauter**, Facebook

1:00PM  
▶ (59.1) *Homomorphic Encryption and Encrypted AI*  
**Jung Hee Cheon**<sup>\*</sup>, Seoul National University, Cryptolab, Inc (1203-11-42515)

2:00PM  
▶ ♦ (59.2) *Security Guidelines for Implementing Homomorphic Encryption*  
**Huijing Gong**<sup>\*</sup>, Intel Labs (1203-68-43490)

2:30PM  
▶ (59.3) *Homomorphic Encryption for Secure AI: Progress, Challenges, and Opportunities*  
**Vishnu Boddeti**<sup>\*</sup>, Michigan State University (1203-68-44941)

3:00PM  
▶ (59.4) *Fully Homomorphic Encryption in Polynomial Modulus – New Developments and Applications*  
**Feng-Hao Liu**<sup>\*</sup>, Washington State University (1203-00-41642)

3:30PM  
(59.5) *Limitations of the decoding-to-LPN reduction via code smoothing*  
**Alexander Barg**<sup>\*</sup>, University of Maryland and **Madhura Pathegama**, University of Maryland (1203-94-41818)

4:00PM  
▶ (59.6) *GPU-based Post Quantum Cryptography and Fully Homomorphic Encryption for Industry Applications*  
**Yarkin Doroz**<sup>\*</sup>, Nvidia (1203-12-43453)

**(60) AMS Special Session on Algebraic Statistics in Our Changing World, II**

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WEDNESDAY, JANUARY 08 1:00PM–5:00PM Yakima 1, Level 1, Seattle Convention Center Arch at 800 Pike

Organizers: **Elizabeth Gross**, University of Hawaii at Manoa

**Jose Israel Rodriguez**, University of Wisconsin-Madison

**Teresa Yu**, University of Michigan

**Yulia Alexandr**, University of California, Los Angeles

1:00PM  
▶ (60.1) *Maximum Likelihood Degree of  $\beta$ -Stochastic Blockmodels*

**Cash Bortner**<sup>\*</sup>, California State University, Stanislaus, **Jennifer Garbett**, Lenoir Rhyne University, **Elizabeth Gross**, University of Hawaii`i at Manoa, **Christopher McClain**, WVU Tech, **Naomi Krawzik**, Sam Houston State University and **Derek Young**, Mount Holyoke College (1203-62-44458)

1:30PM  
▶ (60.2) *Learning Causation from Algebraic Constraints*

**Cole Gagliotti**<sup>\*</sup>, UBC and **Elina Robeva**, UBC (1203-62-44532)

2:00PM  
▶ ♦ (60.3) *Causal Discovery in Time-series Data Using Signature Tensors*

**Pardis Semnani**<sup>\*</sup>, The University of British Columbia (1203-60-44003)

2:30PM  
▶ (60.4) *Identifiability of structural equation models*

**Nicolette Meshkat**<sup>\*</sup>, Santa Clara University, **Elizabeth Gross**, University of Hawaii`i at Manoa and **Maize Curiel**, University of Hawaii`i at Manoa (1203-62-40176)

3:00PM  
(60.5) *Geometry of Gaussian models induced by phylogenetic trees*

**Aida Maraj**<sup>\*</sup>, Max Planck Institute CBG (1203-14-43326)

3:30PM  
(60.6) *Maximum Likelihood Estimation of 3- and 4-Leaf Phylogenetic Trees*

**Max Hill**<sup>\*</sup>, University of Hawaii`i at Mānoa (1203-62-42583)

4:00PM  
▶ ♦ (60.7) *Degrees of the Wasserstein Distance to Small Toric Models*

**Greg Alexander Depaul**, University of California, Davis, **Serkan Hosten**, San Francisco State University, **Nilava Metya**, Rutgers University, New Jersey and **Ikenna Nometa**<sup>\*</sup>, University of Hawaii`i, Mānoa (1203-62-42206)

4:30PM  
▶ (60.8) *Matroid Stratification of ML Degrees of Independence Models*

**Serkan Hosten**<sup>\*</sup>, San Francisco State University, **Oliver Clarke**, University of Edingurgh, **Nataliia Kushnerchuk**, Aalto University and **Janike Oldekop**, Technische Universitaet Berlin (1203-62-42851)

### ***(61) AMS Special Session on Applied Category Theory, II***

WEDNESDAY, JANUARY 08 1:00PM–5:00PM Yakima 2, Level 1, Seattle Convention Center Arch at 800 Pike

Organizers: **Evan Patterson**, Topos Institute  
**Nelson Niu**, University of Washington  
**Kristopher Brown**, Topos Institute

**Priyaa Varshinee Srinivasan**, Topos Institute  
**Priyaa Varshinee Srinivasan**, Topos Institute

1:00PM  
*Panel discussion: Roads to learning category theory ft. Kristine Bauer, University of Calgary, Eugenia Cheng, School of the Art Institute of Chicago, Edmund Harriss, School of Arkansas, Nathaniel Osgood, University of Saskatchewan, and Evan Patterson, Topos Institute*

2:30PM  
▶ (61.2) *Category theory applied to inferentialist philosophy of language*

**Kristopher Brown**<sup>\*</sup>, Topos Institute (1203-18-39207)  
3:00PM  
▶ ♦ (61.3) *Analogical Plan Transfer in Robotics using Functorial Data Migrations*

**Angeline Aguinaldo**<sup>\*</sup>, University of Maryland, College Park (1203-18-43161)

3:30PM  
▶ ♦ (61.4) *Drazin Inverses in Categories*

**Priyaa Varshinee Srinivasan**<sup>\*</sup>, Tallinn University of Technology, **Robin Cockett**, University of Calgary and **Jean-Simon Pacaud Lemay**, Macquarie University (1203-18-43374)

4:00PM  
▶ (61.5) *Applications of Category Theory to Advanced Air Mobility Architecture*

**Nelson Niu**<sup>\*</sup>, University of Washington (1203-18-44671)

4:30PM  
▶ ♦ (61.6) *Endomorphisms of Integer Valued Neural Networks with  $\text{ReLU}_-$*

**Eric R Dolores**<sup>\*</sup>, Pusan National University, **Aldo Guzmán-Sáenz**, Thomas J. Watson Research Center, **Sangil Kim**, Pusan National University, **Susana Lopez Moreno**, Pusan National University and **Jose L Mendoza-Cortes**, Michigan State University (1203-18-43263)

### ***(62) AMS Special Session on Arithmetic Dynamics of Single and Multiple Maps, II***

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 604, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Xander Faber**, IDA / Center for Computing Sciences

**Bella Tobin**, Oregon State University  
**Robert L Benedetto**, Amherst College

1:00PM  
(62.1) *Lie algebras and families of commuting polynomial maps on  $\mathbb{A}^n$*

**Joseph H. Silverman**<sup>\*</sup>, Brown University (1203-37-38857)

1:30PM  
(62.2) *Uniform boundedness of preperiodic points for unicritical polynomials*

**John R. Doyle**<sup>\*</sup>, Oklahoma State University and **Wade M. Hindes**, Texas State University (1203-37-42703)

2:00PM  
(62.3) *Irreducible polynomials in unicritically generated semigroups over  $abc$  fields*

**Wade M. Hindes**<sup>\*</sup>, Texas State University  
(1203-37-42239)

2:30PM  
▶ (62.4) *A FINITENESS RESULT FOR COMMON ZEROS OF ITERATES OF RATIONAL MAPS*

**Xiao Zhong**<sup>\*</sup>, University of Waterloo,  
Department of Pure Mathematics and **Chatchai Noytaptim**, University of Waterloo (1203-37-38629)

3:00PM  
(62.5) *Algebraic billiards and dynamical degrees*  
**Max Weinreich**<sup>\*</sup>, Harvard University (1203-37-38291)

3:30PM  
▶ (62.6) *Rational self-maps of  $\mathbb{P}^n$  with a regular iterate*  
**Sina Saleh**<sup>\*</sup>, Harvard University (1203-37-43208)

4:00PM  
(62.7) *Arithmetic dynamics on character varieties*  
**Cigole Thomas**<sup>\*</sup>, Colorado State University (1203-11-38978)

4:30PM  
(62.8) *Weak Total Ramification and Semistable Reduction*  
**Xander Faber**<sup>\*</sup>, IDA / Center For Computing Sciences (1203-11-43621)

**(63) AMS Special Session on Business, Entrepreneurship, Government, Industry and Nonprofit (BEGIN) Career Development within Mathematics Programs, II**

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM Skagit 3, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **Anna Kinzel**, American Mathematical Society  
**Kelly Lang**, American Mathematical Society

1:00PM  
▶ (63.1) *Panel Discussion with Mathematical Scientists Working in Business, Entrepreneurial, Government, Industry and Nonprofit Organizations*

**Tricity Andrew**, Seattle Children's Hospital, **Sally Chen**, USAA, **Mujibur Rahman Chowdhury**, McKesson, **Catherine Potts**, D-Wave Systems, **Tony Macula**<sup>\*</sup>, JEANSEE, LLC and **Matthew Kehoe**, Michigan Technological University (1203-103-39596)

2:00PM  
▶ (63.2) *Networking with Mathematical Scientists Working in Business, Entrepreneurial, Government, Industry and Nonprofit Organizations*

**Tricity Andrew**, Seattle Children's Hospital, **Sally Chen**, USAA, **Mujibur Rahman Chowdhury**, McKesson, **Catherine Potts**, D-Wave Systems, **Tony Macula**<sup>\*</sup>, JEANSEE, LLC and **Matthew Kehoe**, Michigan Technological University (1203-103-39627)

2:30PM  
▶ (63.3) *K-State Mathematics Graduate Students' Internships Experiences*

**Marianne K Korten**<sup>\*</sup>, Kansas State University, **Lauren M. White**, NASA, **Adriana Ortiz-Aquino**, Whitman College, **David Marcus**, Kansas State University and **Ilyas Mustapha**, Kansas State University (1203-103-42848)

3:30PM  
▶ (63.4) *Mentoring Mathematical Minds through Interdisciplinary Projects with Southern Utah's Business, Industry, and Government Sectors*  
**Vinodh Kumar Chellamuthu**<sup>\*</sup>, Utah Tech University (1203-103-41013)

4:00PM  
▶ (63.5) *Insight into non-academic careers: An industry experts led approach*  
**Guadalupe (Guada) I Lozano**, The University of Arizona, **Kyle Pounder**<sup>\*</sup>, Wealth.com and **David A Glickenstein**, The University of Arizona (1203-103-44617)

4:30PM  
▶ (63.6) *Examining the Experience of Professional Identity Development in an Interactive Mathematics Communications Course*  
**Catherine Towsley**<sup>\*</sup>, University of Rochester (1203-103-43467)

**(64) AMS Special Session on Coding Theory for Modern Applications, II**

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 605, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Allison Beemer**, University of Wisconsin-Eau Claire  
**Eduardo Camps**, Cleveland State University  
**Rafael D'Oliveira**, Clemson University  
**Hiram H. Lopez**, Virginia Tech

1:00PM  
▶ (64.1) *Asymptotically Good Minimal Linear Codes via Expander Graphs*  
**Alessandro Neri**<sup>\*</sup>, University of Naples Federico II (1203-94-44837)

1:30PM  
▶ (64.2) *Codes Over Local Frobenius Non-chain Rings of order 16 Characteristic 4*  
**Steve Szabo**<sup>\*</sup>, Eastern Kentucky University (1203-94-44002)

2:00PM  
(64.3) *Low-complexity Coding and Decoding Techniques for Unsourced Multiple Access*  
**Parastoo Sadeghi**<sup>\*</sup>, University of New South Wales, Canberra, **Rafael D'Oliveira**, Clemson University and **Alex Sprintson**, Texas A&M University (1203-94-43209)

2:30PM  
▶ (64.4) *Group testing matrices from evaluation codes*  
**Kathryn Haymaker**<sup>\*</sup>, Villanova University (1203-94-45089)

3:00PM  
▶ (64.5) *Secret sharing for DNA probability vector*  
**Zhiying Wang**<sup>\*</sup>, University of California, Irvine and **Wenkai Zhang**, University of California, Irvine (1203-94-45735)

3:30PM  
(64.6) *A Zero-Knowledge protocol for bounded hamming and rank vectors*  
**Freeman Slaughter**, Clemson University and **Felice Manganiello**<sup>\*</sup>, Clemson University (1203-11-45312)

4:00PM  
(64.7) *Improving iterative decoding of Quantum LDPC codes*  
**Christine Ann Kelley**<sup>\*</sup>, University of Nebraska - Lincoln, **Kirsten Morris**, University of Nebraska-Lincoln and **Tefjol Pilaha**, University of South Florida (1203-94-45493)

4:30PM (64.8) *The Combinatorics of DNA Data Storage*  
**Alberto Ravagnani**<sup>\*</sup>, Eindhoven University of Technology (1203-94-41849)

**(65) AMS Special Session on Cohomology of Arithmetic Groups, Mapping Class Groups, and Moduli Spaces, II**

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WEDNESDAY, JANUARY 08 1:00PM–5:00PM 614, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Sam Payne**, UT Austin

**Andrew Putman**, University of Notre Dame

1:00PM (65.1) *Uniform twisted homological stability*  
**Jeremy Kenneth Miller**<sup>\*</sup>, Purdue University, **Peter Patzt**, University of Oklahoma, **Dan Petersen**, Stockholm University and **Oscar Randal-Williams**, University of Cambridge (1203-55-40897)

1:30PM (65.2) *Hopf algebras and the cohomology of  $GL_n(\mathbb{Z})$*   
**Peter Patzt**<sup>\*</sup>, University of Oklahoma (1203-11-40878)

2:00PM (65.3) *The Cohen-Lenstra moments over function fields via the stable homology of dihedral group Hurwitz spaces*  
**Aaron Landesman**<sup>\*</sup>, Harvard University and **Ishan Levy**, University of Copenhagen (1203-11-39162)

2:30PM (65.4) *Topology of moduli spaces of genus one stable maps to projective space*  
**Siddarth Kannan**<sup>\*</sup>, Massachusetts Institute of Technology and **Dekun Terry Song**, University of Cambridge (1203-14-38717)

3:00PM (65.5) *Top-Weight Cohomology of Shimura Varieties*  
**Juliette Emmy Bruce**<sup>\*</sup>, Dartmouth College (1203-14-39674)

3:30PM (65.6) *Prym Representations and Twisted Cohomology of the Mapping Class Group with Level Structures*  
**Xiyan Zhong**<sup>\*</sup>, University of Notre Dame (1203-14-37858)

4:00PM (65.7) *K-rings of wonderful varieties and matroids*  
**Shiyue Li**<sup>\*</sup>, Institute for Advanced Study, **Matt W Larson**, Princeton/Institute for Advanced Study, **Nicholas Proudfoot**, University of Oregon and **Sam Payne**, UT Austin, Institute for Advanced Study (1203-14-44858)

4:30PM (65.8) *(Lots of) Unstable cohomology of moduli spaces of curves with marked points*  
**Nir Gadish**<sup>\*</sup>, University of Pennsylvania (1203-14-39330)

**(66) AMS Special Session on Conservation Laws and Boundary Value Problems in far from Equilibrium Dynamics, II**

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WEDNESDAY, JANUARY 08 1:00PM–4:30PM 303, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **James G Glimm**, State University of New York at Stony Brook

**Snezhana I. Abarzhi**, California Institute of Technology

1:00PM (66.1) *The Metastable State: Approaching Equilibrium on the FPUT Model*  
**David Campbell**<sup>\*</sup>, Boston University (1203-82-38568)

1:30PM (66.2) *Non-equilibrium response of thermodynamic and quantum systems to time-symmetric disturbances*  
**Alexander Y Klimenko**<sup>\*</sup>, The University of Queensland (1203-80-42902)

2:00PM (66.3) *A vacuum-core vortex and rotation-free torus in relativistic perfect fluids*  
**Chihiro Matsuoka**<sup>\*</sup>, Osaka Metropolitan University and **Hideki Ishihara**, Osaka Metropolitan University (1203-76-38509)

2:30PM (66.4) *Interface Dynamics for Ideal and Realistic Fluids*  
**Dan V. Ilyin**<sup>\*</sup>, California Institute of Technology (1203-35-38781)

3:00PM (66.5) *Marangoni convection in non-isothermal surfactant solutions*  
**Alexander A. Nepomnyashchy**<sup>\*</sup>, Department of Mathematics, Technion - Israel Institute of Technology and **Alexander B. Mikishev**, Department of Engineering Technology, Sam Houston State University (1203-76-38388)

3:30PM (66.6) *Effect of surface tension and gravity on compressible Kelvin-Helmholtz instability*  
**Yasuhide Fukumoto**<sup>\*</sup>, Kyushu University, **Rong Zou**, Hawaii Pacific University, **Kazuo Matsuura**, Ehime University and **Nobutaka Taniguchi**, University of Tokyo (1203-76-38399)

4:00PM (66.7) *Canonical conservation laws in hydrodynamic and magnetohydrodynamic flows*  
**Charalampos Markakis**<sup>\*</sup>, University of Illinois at Urbana-Champaign (1203-76-43203)

**(67) AMS Special Session on Dynamical Systems Modeling Approaches Across Multiple Biological Scales, II**

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WEDNESDAY, JANUARY 08 1:00PM–5:00PM Skagit 5, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Daniel Brendan Cooney**, University of Illinois Urbana-Champaign

**Chadi M Saad-Roy**, University of California, Berkeley

**Chris M. Heggerud**, University of California, Davis

1:00PM (67.1) *PDE Models of Cross-Scale Evolutionary Dynamics*  
**Daniel Brendan Cooney**<sup>\*</sup>, University of Illinois Urbana-Champaign (1203-92-45650)

1:30PM (67.2) *Mathematical modeling of spatial evolution*  
**Natalia Komarova**<sup>\*</sup>, UCSD (1203-92-41037)

2:00PM  
▶ (67.3) *On modeling dispersal in competition models with and without harvesting*  
**Elena Braverman\***, University of Calgary (1203-92-39412)

2:30PM  
▶ (67.4) *A Spatial Understanding of Coral Dynamics Under Multiple Stressors*  
**Jennifer Paige\***, University of California, Davis (1203-92-43265)

3:00PM  
(67.5) *Zooming in and out in density and time: process approximation at any scale*  
**Eric Foxall\***, University of British Columbia (1203-60-41005)

3:30PM  
(67.6) *Extreme first passage times for populations of identical rare events*  
**Jay Mack Newby\***, University of Alberta (1203-92-45390)

4:00PM  
▶ (67.7) *Stoichiometric microplastics models in natural and laboratory environments*  
**Tianxu Wang\***, University of Alberta and **Hao Wang\***, University of Alberta (1203-34-39881)

4:30PM  
▶ (67.8) *Emergent Transportation Networks*  
**Brendan Alexander Wallace\***, University of Washington (1203-92-44678)

**(68) AMS Special Session on Epidemic Modeling: Current Status and Future Directions, I**

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 608, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Heeralal Janwa\***, University of Puerto Rico, Rio Piedras  
**Will Casey\***, US Naval Academy  
**Shirshendu Chatterjee\***, CUNY  
**Ernest Battifarano\***, Retired  
**Leigh Metcalf\***, Carnegie Mellon University

1:00PM  
▶ (68.1) *On the stability of a generalized SIS model with time-varying recovery rates*  
**Scott W Greenhalgh\***, Siena College, **Michael Frutschy\***, Siena College, **Tabitha Henriquez\***, Siena College and **Rebecah Lenoard\***, Siena College (1203-92-45779)

1:30PM  
▶ (68.2) *Modeling, Inference, and Prediction of Epidemiology Time Series Data with a Mixture of Causal Non-Linear Dynamic Conditions.*  
**William Austin Casey\***, United States Naval Academy (1203-92-44020)

2:00PM  
(68.3) *Modeling self-propagating malware with epidemiological models*  
**Alesia Chernikova\***, Northeastern University (1203-34-38987)

2:30PM  
▶ (68.4) *Temporal Evolution of Geographic Clusters of Disease Spread Patterns*  
**Leigh Metcalf\***, Carnegie Mellon University, **Heeralal Janwa\***, University of Puerto Rico, Rio Piedras, **Shirshendu Chatterjee\***, CUNY and **Will Casey\***, US Naval Academy (1203-15-43952)

3:00PM  
▶ (68.5) *Navigating the Pandemic with Numbers: The Power of Ensemble Forecasts*  
**Osman Nuri Yogurtcu\***, FDA/CBER, **Carson C Chow\***, NIH/NIDDK, **Marisabel Rodriguez Messan\***, FDA/CBER, **Richard C Gerkin\***, Arizona State University, **Artur A Belov\***, FDA/CBER, **Hong Yang\***, FDA/CBER and **Richard A Forshee\***, FDA/CBER (1203-92-39489)

3:30PM  
▶ (68.6) *EpiFFORMA: Ensemble Weighting for Forecasting Emerging Epidemic Time Series without Historical Data*  
**Alexander Craig Murph\***, Los Alamos National Laboratory (1203-62-39313)

4:00PM  
▶ (68.7) *Modeling COVID-19 Incidence Rates Through Social Media Activity*  
**April Edwards\***, United States Naval Academy (1203-91-40086)

**(69) AMS Special Session on Generalized Derivatives: Analysis on Time Scales, Fractional Calculus, Difference Equations, and Others, II**

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 304, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Tom Cuchta\***, Marshall University  
**Nick Wintz\***, Lindenwood University

1:00PM  
▶ (69.1) *The Rest of the Story: Introducing the Notion of Frequency on Time Scales and the Simple Harmonic Oscillator*  
**Billy Jackson\***, University of Illinois Chicago, **John Davis\***, Baylor University and **Dylan Poulsen\***, Washington College (1203-34-37949)

1:30PM  
(69.2) *Matrix-valued periodicity on isolated time scales*  
**Tom Cuchta\***, Marshall University, **Sabrina H Streipert\***, University of Pittsburgh and **Nick Wintz\***, Lindenwood University (1203-34-44409)

2:00PM  
▶ (69.3) *Averaging principle for a general class of periodic functions on isolated time scales*  
**Sabrina H Streipert\***, University of Pittsburgh, **Martin Bohner\***, Missouri University of Science and Technology and **Jaqueline Mesquita\***, Universidade de Brasilia (1203-34-44025)

2:30PM  
(69.4) *Inverse spectral problem for a q-difference equation*  
**F. Ayca Cetinkaya\***, The University of Tennessee Chattanooga (1203-34-43469)

3:00PM  
▶ (69.5) *A Discretization of the Lotka-Volterra System Using the Framework of the Time Scale Calculus*  
**Chris Ahrendt\***, University of Wisconsin-Eau Claire (1203-34-42868)

3:30PM  
▶ (69.6) *Integrating Time Scales into Prostate Cancer Therapy: An Approach to Prostate-Specific Antigen Dynamics*  
**Raegan J Higgins\***, Texas Tech University and **Nourridine Siewe\***, Rochester Institute of Technology (1203-34-43470)

4:00PM  
▶ (69.7) *Analysis of neuronal oscillations of fractional-order Morris-Lecar model*  
**Tahmineh Azizi**<sup>\*</sup>, Florida State University (1203-92-36797)

4:30PM  
▶ (69.8) *SOME INTEGRAL TRANSFORMS INVOLVING GENERALIZED MATRIX MITTAG-LEFFLER FUNCTION*  
**Prof. Harish Nagar, M. Sc, Ph. D.**<sup>\*</sup>, Department of Mathematics, University Institute of Sciences, Chandigarh University, Mohali, Punjab, India and **Shweta Lather**, Research Scholar, Department of Mathematics, Chandigarh University, Gharuan, Mohali (1203-33-41088)

***(70) AMS Special Session on Harnessing the Power of Mathematical Models to Understand Population Dynamics, Ecology, and Evolution, II***

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM Skagit 4, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizer: **Lale Asik**, University of the Incarnate Word

1:00PM  
▶ ◆ (70.1) *Multi-scale approach in modeling population dynamics of social insect colonies with social dynamics*  
**Lucero Rodriguez Rodriguez**, Arizona State University, **Tamantha Pizarro**, Arizona State University and **Yun Kang**<sup>\*</sup>, Arizona State University (1203-91-37686)

1:30PM  
▶ ◆ (70.2) *Stochastic Modeling of Asian Long-Horned Beetle Infestation*  
**Keisha Cook**<sup>\*</sup>, Clemson University (1203-60-42355)

2:00PM  
▶ (70.3) *CANCELLED - Modeling the Effects of Toxicants on Predator-Prey Dynamics Using Dynamic Energy Budget (DEB) Theory*  
**Md Nazmul Hassan**<sup>\*</sup>, Texas A&M University-Kingsville (1203-34-45646)

2:30PM  
▶ (70.4) *Analyzing the Impact of Climate Change on Fishery-Independent Biomass Estimates through Simulation*  
**Benjamin Levy**<sup>\*</sup>, Babson College (1203-92-44797)

3:00PM  
(70.5) *Small fluctuations induce rapid extinction in stochastic population models*  
**Jacob Madrid**<sup>\*</sup>, Duke University (1203-92-45622)

3:30PM  
▶ (70.6) *Controlling the unmanageable: insight into control methods for biological systems*  
**Christina Edholm**<sup>\*</sup>, Scripps College (1203-92-44520)

4:00PM  
▶ (70.7) *Matching Habitat Choice and the Evolution of a Species' Range*  
**Farshad Shirani**<sup>\*</sup>, Georgia Institute of Technology and **Judith Miller**, Georgetown University (1203-92-42690)

4:30PM  
(70.8) *Investigating the pattern formation in the model of urban crime with law enforcement: bifurcations, amplitude equations, and parameter-behavior relations*

**Madi Yerlanov**<sup>\*</sup>, University of Colorado at Boulder, **Nancy Rodriguez**, University of Colorado at Boulder and **Qi Wang**, Southwestern University of Finance and Economics (1203-91-40353)

***(71) AMS Special Session on Knots, 3-manifolds, and Their Invariants, II***

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 617, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Kate Petersen**, University of Minnesota Duluth  
**Christine Ruey Shan Lee**, Texas State University  
**Shelly Harvey**, Rice University  
**Moshe Cohen**, State University of New York at New Paltz  
**Margaret I Doig**, Creighton University

1:00PM  
▶ (71.1) *How many crossing changes does it take to get to a homotopy trivial link?*  
**Anthony Bosman**<sup>\*</sup>, Andrews University, **Christopher William Davis**, University Of Wisconsin - Eau Claire, **Taylor E Martin**, Sam Houston State University, **Carolyn Otto**, University of Wisconsin-Eau Claire and **Katherine R Vance**, Simpson College (1203-57-45220)

1:30PM  
◆ (71.2) *On 2-splitting Homomorphisms Induced by Relative Group Trisections*  
**Nickolas A Castro**<sup>\*</sup>, Rice University, **Jason Joseph**, North Carolina School of Science and Mathematics and **Patrick McFaddin**, Fordham University (1203-57-45116)

2:00PM  
▶ (71.3) *A category generated by a 4-valent vertex*  
**Anup Poudel**<sup>\*</sup>, The Ohio State University, **Giovanni Ferrer**, The Ohio State University and **Jiaqi Lu**, The Ohio State University (1203-17-45576)

2:30PM  
▶ (71.4) *Average crosscap number of a 2-bridge knot*  
**Moshe Cohen**, State University of New York At New Paltz, **Thomas Kindred**<sup>\*</sup>, Wake Forest University, **Adam M. Lowrance**, Vassar College, **Patrick D. Shanahan**, Loyola Marymount University and **Cornelia A Van Cott**, University of San Francisco (1203-57-45016)

3:00PM  
(71.5) *Farey recursion and the Riley slice*  
**Eric B. Chesebro**<sup>\*</sup>, University of Montana (1203-57-44916)

3:30PM  
(71.6) *Heegaard Floer homology and the word metric on the Torelli group*  
**Miriam Kuzbary**<sup>\*</sup>, Georgia Institute of Technology, **Tye Lidman**, North Carolina State University and **Santana Afton**, Georgia Institute of Technology (1203-57-44426)

4:00PM  
(71.7) *Lipschitz-Sarkar Stable Homotopy Type for Certain Planar Trivalent Graph with Perfect Matchings*  
**Nilangshu Bhattacharyya**<sup>\*</sup>, Louisiana State University (1203-54-44579)

4:30PM *Why - really - are Floer type invariants independent of the choice of decomposition?*  
▶ ◆ (71.8) **Katrin Wehrheim**<sup>\*</sup>, free radical (1203-53-44965)

**(72) AMS Special Session on Mathematical Frontiers of Data Science for National Security, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM Tahoma 1, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Marcus J Bishop**, National Security Agency  
**John Anthony Emanuella**, National Security Agency  
**R W R Darling**, National Security Agency

1:00PM *Proofs, Protocols, and Possibilities: Exploring the Math at the Crossroads of AI and Cybersecurity*  
▶ (72.1) **John Anthony Emanuella**<sup>\*</sup>, National Security Agency (1203-104-42116)

1:30PM *Topological Data Analysis of Trojan Detector Ensembles*  
▶ (72.2) **Melinda Kleczynski**<sup>\*</sup>, National Institute of Standards and Technology, **Alden Dima**, National Institute of Standards and Technology and **Anthony Kearsley**, National Institute of Standards and Technology (1203-104-45344)

2:00PM *How do LLMs perform arithmetic and why do they make mistakes*  
▶ (72.3) **Elizabeth Coda**<sup>\*</sup>, Pacific Northwest National Laboratory, **John Buckheit**, Pacific Northwest National Laboratory, **Davis Richard Brown**, Pacific Northwest National Laboratory, **Brendan Kennedy**, Pacific Northwest National Laboratory, **Loc Truong**, Pacific Northwest National Laboratory, **Bill Kay**, Pacific Northwest National Laboratory, **Tegan Emerson**, Pacific Northwest National Laboratory, **Cliff Joslyn**, Pacific Northwest National Laboratory, **Michael Henry**, Pacific Northwest National Laboratory, **John Anthony Emanuella**, National Security Agency and **Henry Kvinge**, Pacific Northwest National Laboratory (1203-68-44615)

2:30PM *Open Applied Topology: A new foundation for research in cybersecurity and the sciences*  
▶ ◆ (72.4) **Gregory Henselman-Petrusek**<sup>\*</sup>, Pacific Northwest National Laboratory (1203-68-44068)

3:00PM *AI for math and math for AI*  
(72.5) **Patrick Shafto**<sup>\*</sup>, DARPA, Rutgers University (1203-68-40091)

3:30PM *Secure AI Through Verification, Transparency, and Fairness*  
▶ (72.6) **Jessica Langebrake Inman**<sup>\*</sup>, Georgia Tech Research Institute and **Daniel Clouse**, DoD (1203-68-43341)

4:00PM *Formally Verifying Data Driven Systems: From Medial Devices to Large Language Models*  
▶ ◆ (72.7) **Taisa Kushner**<sup>\*</sup>, Galois (1203-68-44690)

4:30PM *Subdivision-inspired strategies for sheaf modeling*  
▶ (72.8) **Michael Robinson**<sup>\*</sup>, American University (1203-18-39028)

**(73) AMS Special Session on Mathematics of Knowledge Graphs: Theory and Application, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM Tahoma 4, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Bill Kay**, Pacific Northwest National Laboratory  
**Patrick Mackey**, Pacific Northwest National Laboratory  
**Sinan G Aksoy**, Pacific Northwest National Laboratory

1:00PM *Mathematical Foundations of Knowledge Graph Foundation Models*  
▶ ◆ (73.1) **Bruno Ribeiro**<sup>\*</sup>, Purdue University (1203-68-41397)

2:00PM *Dynamical Analysis of Knowledge Systems*  
▶ (73.2) **Audun Myers**<sup>\*</sup>, Pacific Northwest National Laboratory, **Cliff Joslyn**, Pacific Northwest National Laboratory, **Emilie Purvine**, Pacific Northwest National Laboratory and **Jason P LaRuez**, Rochester Institute of Technology (1203-05-44444)

2:30PM *Representations of annotated networks using knowledge hypergraphs*  
▶ (73.3) **Brenda Praggastis**<sup>\*</sup>, Pacific Northwest National Laboratory (1203-05-41665)

3:00PM *The Matrix: Reloaded is a Knowledge Graph*  
▶ (73.4) **Jessie D. Jamieson**<sup>\*</sup>, CERT Division, Carnegie Mellon University and **Joshua Fallon**, CERT Division, Carnegie Mellon University (1203-05-41722)

4:00PM *But... How do you know?*  
▶ (73.5) **Raymond P Carney**<sup>\*</sup>, Tenable (1203-05-42379)

**(74) AMS Special Session on New Trends in Lie Theory and Mathematical Physics, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 606, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Juan J. Villarreal**, Virginia Commonwealth University  
**Marco Aldi**, Virginia Commonwealth University

1:00PM *Generalized Correlation Functions for Vertex Operator Algebras and Their Modular Transformation Properties*  
(74.1) **Darlayne Addabbo**<sup>\*</sup>, SUNY Polytechnic Institute and **Christoph A Keller**, The University of Arizona (1203-17-44146)

2:00PM *Higgs and Coulomb Branches from Raviolo Vertex Algebras*  
(74.2) **Niklas Kelly Garner**<sup>\*</sup>, University of Oxford (1203-81-43685)

3:00PM (74.3) *Fusion Rules determined by one-pointed restricted conformal blocks*  
**Jianqi Liu\***, University of Pennsylvania (1203-81-41783)

4:00PM (74.4) *The family of subalgebras of the monster Lie algebra produced by subspaces of primary vectors in the monster Vertex algebra.*  
**Elizabeth Graf Jurisich\***, College of Charleston, **Darlayne Addabbo**, University of Arizona, **Lisa Carbone**, Rutgers University, **Maryam Khaqan**, University of Toronto and **Scott Murray**, Toronto, Canada (1203-17-43585)

**(75) AMS Special Session on Partition Theory and  $q$ -Series, II**

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM** Tahoma 3, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Dennis Eichhorn**, University of California, Irvine  
**Brandt Kronholm**, University of Texas Rio Grande Valley  
**William Jonathan Keith**, Michigan Technological University

1:00PM ▶ (75.1) *Derivatives of theta functions as Traces of Partition Eisenstein series*  
**Ajit Singh\***, University of Virginia (1203-11-44499)

1:30PM ▶ (75.2) *Traces of Partition Eisenstein Series*  
**Michael J Griffin\***, Vanderbilt University, **Tewodros Amdeberhan**, Tulane University, **Ajit Singh**, University of Virginia and **Ken Ono**, University of Virginia (1203-05-43500)

2:00PM (75.3) *Quasimodular forms,  $q$ -multiple zeta values, and Partitions*  
**William Craig\***, U.S. Naval Academy (1203-05-44476)

2:30PM (75.4) *Some Examples of Modular Symmetry Breaking*  
**Nicolas Allen Smoot\***, University of Vienna, **Frank G. Garvan**, University of Florida and **James A. Sellers**, University of Minnesota Duluth (1203-11-43319)

3:00PM (75.5) *Congruence properties modulo prime powers for a class of partition functions*  
**Ms. Swati\***, University of South Carolina and **Matthew Boylan**, University of South Carolina (1203-05-42391)

3:30PM (75.6) *New symmetries for overpartition rank and crank functions*  
**Rishabh Sarma\***, University of Florida and **Frank G. Garvan**, University of Florida (1203-11-43097)

4:00PM ▶ (75.7) *Legendre-signed partition numbers and their vanishings*  
**Taylor Daniels\***, Purdue University (1203-11-43158)

4:30PM (75.8) *Frobenius symbol and GBG-rank*

**Ae Ja Yee\***, Pennsylvania State University (1203-05-45528)

**(76) AMS Special Session on Polymath Jr REU Student Research Session, II**

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM** Chelan 2, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Zhanar Berikkyzy**, Fairfield University  
**Adam Sheffer**, Baruch College, CUNY  
**Steven Joel Miller**, Williams College

1:00PM ▶ ♦ (76.1) *Zero-Sum Sets and Affine Geometry in  $\mathbb{Z}_2^n$*   
**Sarah Covey\***, Polymath Jr (1203-51-44039)

1:30PM ▶ (76.2) *PRODUCTS AND POWERS OF PRINCIPAL SYMMETRIC IDEALS*  
**Vinuge Dinusith Rupasinghe\***, Department of Mathematics, University of Colombo (1203-13-42736)

2:00PM ▶ (76.3) *Asymmetric Colorings of Graphs*  
**Kyle Wah` Pon\***, University of California, San Diego, **Evan Frankel**, Swarthmore College, **Tejas Gautam Shende**, Indian Institute of Technology Bombay, **Yi Wang**, University of Michigan and **Bruno Aguilar**, Universidad Nacional Autónoma de México (1203-05-42877)

2:30PM ▶ (76.4) *Describing One Sided Ideals of Leavitt Path Algebras Using Real Generators*  
**Benjamin N Schussler\***, Polymath Jr. (1203-16-43302)

3:00PM ▶ (76.5) *The M&M Game: A Study in Stochastic Processes and Probabilistic Models*  
**Sneesh K Das\***, UCLA, **Evan Li**, UCLA and **Kurt Wang**, Hong Kong University of Science and Technology (1203-60-43486)

3:30PM ▶ (76.6) *Ribbon Knots*  
**Fanni Kertesz\***, Bellarmine University, Polymath Jr., **Miranda Jiang**, University of California, Santa Barbara, Polymath Jr., **Kevin Peng**, University of California, Berkeley, Polymath Jr. and **Arun Ferrán-Sapatnekar**, St. Louis Park High School, Polymath Jr. (1203-57-43495)

4:00PM ▶ (76.7) *An Algebraic Construction of Complete Regular Maps via Prime Ideals*  
**Omar Elshinawy\***, Constructor University, **Matthew Snodgrass**, Carnegie Mellon University and **Junxiang Zhang**, Brown University (1203-05-43752)

4:30PM ▶ (76.8) *Obtain Affine Model for  $SK_9$  Dessin*  
**Ruizhen Liu**, University of Toronto and **Yanshu Wang\***, Nankai University (1203-11-42192)

**(77) AMS Special Session on Recent Advancements in the Numerical Analysis of Nonlinear Partial Differential Equations, II**

WEDNESDAY, JANUARY 08 1:00PM-5:00PM 213, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Yi Zhang**, University of North Carolina at  
Greensboro  
**Thomas Lee Lewis**, University of North  
Carolina at Greensboro

- 1:00PM *A New Boundary Condition for the Nonlinear  
Poisson-Boltzmann Equation in Electrostatic  
Analysis of Proteins*  
▶ ◆ (77.1) **Sylvia Amihere**<sup>\*</sup>, Southern Methodist  
University, **Yiming Ren**, The University of  
Alabama, **Weihua Geng**, Southern Methodist  
University and **Shan Zhao**, University of  
Alabama (1203-65-43632)
- 1:30PM *Volumetric Methods for Computing the  
Optimal Transport Mapping on Surfaces*  
▶ (77.2) **Axel Turnquist**<sup>\*</sup>, University of Texas at Austin  
(1203-65-41228)
- 2:00PM *A Canonical Gauge for Computing of  
Eigenpairs of the Magnetic Schrödinger  
Operator*  
▶ ◆ (77.3) **Jeffery Ovall**, Portland State University and **Li  
Zhu**<sup>\*</sup>, Portland State University (1203-65-  
40577)
- 2:30PM *Strong convergence for finite element  
approximations of the stochastic Navier-Stokes  
equations with multiplicative noise*  
(77.4) **Liet Vo**<sup>\*</sup>, University of Texas Rio Grande Valley  
(1203-65-38000)
- 3:00PM *Positivity and maximum principle preserving  
discontinuous Galerkin finite element schemes  
for a coupled flow and transport*  
(77.5) **Shihua Gong**, The Chinese University of Hong  
Kong, Shenzhen, **Young-Ju Lee**, Texas State  
University, **Yukun Li**<sup>\*</sup>, University of Central  
Florida and **Yue Yu**, The Chinese University of  
Hong Kong, Shenzhen (1203-65-40514)
- 3:30PM *VARIATIONAL MODEL AND NUMERICAL  
ANALYSIS OF FLUID IN POROELASTIC MEDIUM*  
(77.6) **Arkadz Kirshtein**<sup>\*</sup>, Texas A&M -Corpus Christi,  
Texas, **James H Adler**, Tufts University and  
**Xiaozhe Hu**, Tufts University (1203-65-44297)
- 4:00PM *Discontinuous Galerkin Methods for an Elliptic  
Optimal Control Problem with a Convection-  
Dominated State Equation*  
◆ (77.7) **Satyajith Bommana Boyana**<sup>\*</sup>, Florida  
Polytechnic University, **Thomas Lee Lewis**,  
University of North Carolina at Greensboro,  
**Sijing Liu**, Worcester Polytechnic Institute and  
**Yi Zhang**, University of North Carolina at  
Greensboro (1203-65-42253)
- 4:30PM *Numerical Analysis of Penalty--based Ensemble  
Methods*  
▶ ◆ (77.8) **Rui Fang**<sup>\*</sup>, University of Pittsburgh (1203-65-  
39721)

**(78) AMS Special Session on Recent Developments  
in Regularization Methods for Nonlinear Inverse  
Problems, II**

WEDNESDAY, JANUARY 08 1:00PM-5:00PM 210, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Otmar Scherzer**, University of Vienna  
**Bernd Hofmann**, Chemnitz University of  
Technology  
**Akhtar A. Khan**, Rochester Institute of  
Technology

- 1:00PM *Inverse problems for semilinear Schrödinger  
equations at large frequency via polynomial  
resolvent estimates on manifolds*  
(78.1) **Katya Krupchyk**<sup>\*</sup>, UC Irvine (1203-35-45088)
- 1:30PM *On an inverse source problem in scattering  
planar domain with partial boundary data*  
▶ (78.2) **Kamran Sadiq**<sup>\*</sup>, Radon Institute for  
Computational and Applied Mathematics  
(1203-35-41099)
- 2:00PM *Fourier Reconstruction in Diffraction  
Tomography for Herglotz Wave Illumination*  
(78.3) **Noemi Naujoks**<sup>\*</sup>, University of Vienna (1203-  
45-39479)
- 2:30PM *A Tikhonov-based regularization method for  
inverse source problems for fractional  
parabolic equations and the reconstruction  
algorithm*  
▶ (78.4) **Thi-Phong Nguyen**<sup>\*</sup>, New Jersey Institute of  
Technology and **Van Duc Nguyen**, Vinh  
University, Vietnam (1203-49-43000)
- 3:00PM *Iteratively regularized Gauss-Newton methods  
for random (and sequential) data*  
▶ (78.5) **Frank Werner**<sup>\*</sup>, Julius-Maximilians-Universität  
Würzburg (1203-65-37633)
- 3:30PM *On the Convergence of Stochastic Gradient  
Descent and Its Variants for Nonlinear Ill-Posed  
Inverse Problems*  
▶ (78.6) **Zehui Zhou**<sup>\*</sup>, Rutgers University (1203-65-  
39024)
- 4:00PM *Quadratic neural networks for solving inverse  
problems.*  
(78.7) **Cong Shi**<sup>\*</sup>, University of Vienna (1203-49-  
44782)
- 4:30PM *A Novel Stochastic Approximation Framework  
for Nonlinear Inverse Problems of Estimating  
Random Coefficients in PDEs.*  
◆ (78.8) **Akhtar A. Khan**<sup>\*</sup>, Rochester Institute of  
Technology (1203-49-42574)

**(79) AMS Special Session on Research from the  
Graduate Research Workshop in Combinatorics, II**

WEDNESDAY, JANUARY 08 1:00PM-5:00PM Tahoma 5, Level  
Three, Seattle Convention Center  
Arch at 800 Pike

Organizers: **Steve Butler**, Iowa State University  
**Puck Rombach**, University of Vermont

- 1:00PM *The Graduate Research Workshop in  
Combinatorics (GRWC): An Overview*
- 1:30PM *Kohnert Properties of Northeast Diagrams*  
▶ (79.2)

**Beth Anne Castellano**<sup>\*</sup>, Dartmouth College, **Alexander Moon**, University of Wisconsin-Milwaukee, **Aram Bingham**, Independent Researcher, **Kimberly P. Hadaway**, Iowa State University, **Reuven Hodges**, University of Kansas, **Yichen Ma**, Cornell University and **Kyle Salois**, Colorado State University (1203-05-42027)

2:00PM  
(79.3)

*The  $\mathbb{S}$ -positivity of the chromatic symmetric function for twinned paths and cycles*  
**Esther Banaian**, University of California, Riverside, **Laura Colmenarejo**, North Carolina State University, **Kyle Celano**<sup>\*</sup>, Wake Forest University, **Megan Chang-Lee**, Brown University, **Owen Goff**, University of Wisconsin - Madison, **Jamie Kimble**, Michigan State University, **Lauren Kimpel**, Johns Hopkins, **John Lentfer**, University of California, Berkeley, **Jinting Liang**, University of British Columbia and **Sheila Sundaram**, University of Minnesota - Twin Cities (1203-05-43356)

2:30PM  
(79.4)

*Canonizing Graphs of Bounded Rank-Width in Parallel via Weisfeiler--Leman*  
**Michael Levet**, College of Charleston, **Puck Rombach**, University of Vermont and **Nicholas Sieger**<sup>\*</sup>, Iowa State University (1203-68-40930)

3:00PM  
▶ (79.5)

*On Odd Covers of Cliques and Disjoint Unions*  
**Calum Buchanan**, University of Vermont, **Alexander Clifton**, Institute for Basic Science, **Eric Culver**<sup>\*</sup>, Brigham Young University, **Peter Frankl**, Alfred Renyi Institute of Mathematics, **Jiaxi Nie**, Georgia Institute of Technology, **Kenta Ozeki**, Yokohama National University, **Puck Rombach**, University of Vermont and **Mei Yin**, University of Denver (1203-05-40185)

3:30PM  
▶ (79.6)

*On the Interval Coloring Impropriety of Graphs*  
**Nicholas Crawford**<sup>\*</sup>, University of Colorado Denver, **Mackenzie Carr**, Simon Fraser University, **Leilani Pai**, University of Nebraska-Lincoln, **Eun-Kyung Cho**, Hankuk University of Foreign Studies, **Vesna Iršič**, Simon Fraser University and **Rebecca Robinson**, University of Colorado Denver (1203-05-40376)

4:00PM  
(79.7)

*On odd colorings and proper conflict-free colorings of planar graphs with girth conditions*  
**Owen Henderschedt**<sup>\*</sup>, Auburn University, **James Anderson**, Georgia Institute of Technology, **Herman Chau**, University of Washington, **Eun-Kyung Cho**, Hankuk University of Foreign Studies, **Nicholas Crawford**, University of Colorado Denver, **Stephen G. Hartke**, University of Colorado Denver, **Emily Heath**, Iowa State University, **Hyemin Kwon**, Ajou University and **Zhiyuan Zhang**, Toronto Metropolitan University (1203-05-42153)

**(80) AMS Special Session on Several Complex Variables, Partial Differential Equations, and CR Geometry, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 201, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Sean N. Curry**, Oklahoma State University  
**Anne-Katrin Gallagher**, Gallagher Tool & Instrument, Redmond, WA  
**Jiri Lebl**, Oklahoma State University

1:00PM  
▶ (80.1)

*Spectral Theory of the Kohn Laplacian on Quotient Manifolds*  
**Yunus E. Zeytuncu**<sup>\*</sup>, University of Michigan-Dearborn (1203-32-39738)

1:30PM  
▶ (80.2)

*The Diederich--Fornæss index and the  $\bar{\partial}$ -Neumann problem*  
**Bingyuan Liu**<sup>\*</sup>, University of Texas Rio Grande Valley and **Emil Straube**, Texas A&M University (1203-32-39483)

2:00PM  
(80.3)

*Global regularity for the  $\bar{\partial}$ -Neumann problem on pseudoconvex manifolds*  
**Andrew S. Raich**<sup>\*</sup>, University of Arkansas and **Khanh Vu Tran**, International University, Vietnam National University Ho Chi Minh City (1203-32-45448)

2:30PM  
(80.4)

*Sobolev and  $H^1$  estimates for the  $\overline{\partial}$  equation on finite domains in  $\mathbb{C}^2$*   
**Ziming Shi**<sup>\*</sup>, University of California - Irvine (1203-32-40872)

3:00PM  
(80.5)

*The Holomorphic Neumann and Robin Problems on a Lipschitz Domain*  
**William E Gryc**<sup>\*</sup>, Muhlenberg College, **Loredana Lanzani**, Università di Bologna, **Jue Xiong**, University Of Colorado Boulder and **Yuan Zhang**, Purdue University Fort Wayne (1203-30-36512)

3:30PM  
◆ (80.6)

*Unique continuation of Schrödinger-type equations for the Cauchy-Riemann operator*  
**Yifei Pan**, Purdue University Fort Wayne and **Yuan Zhang**<sup>\*</sup>, Purdue University Fort Wayne (1203-32-39444)

4:00PM  
(80.7)

*Bergman Einstein metrics on two dimensional Stein spaces*  
**Soumya Ganguly**<sup>\*</sup>, University of California, San Diego (1203-32-39537)

4:30PM  
(80.8)

*Interpolation of operators and the Bergman projection*  
**Debraj Chakrabarti**<sup>\*</sup>, Central Michigan University and **Zhenghui Huo**, Duke Kunshan University (1203-32-40046)

**(81) AMS Special Session on Theoretical and Numerical Aspects of Fractional and Nonlocal Models, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 203, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Animesh Biswas**, University of Nebraska-Lincoln  
**Qiao Zhuang**, University of Missouri-Kansas City  
**Nicole Buczkowski**, Worcester Polytechnic Institute

- 1:00PM  
▶ (81.1) *Dynamic brittle fracture formulated as an initial value problem*  
**Robert Lipton\***, Louisiana State University and **Debdeep Bhattacharya**, Grinnell University (1203-45-44575)
- 1:30PM  
(81.2) *A definition of fractional  $sk$ -dimensional measure*  
**Cornelia Mihaila\***, Saint Michael's College and **Brian Seguin**, Loyola University Chicago (1203-49-43884)
- 2:00PM  
(81.3) *A Positivity-preserving Fast Solver for Time-fractional Convection-diffusion Equations*  
**Jiangguo Liu\***, Colorado State University (1203-65-42875)
- 2:30PM  
◆ (81.4) *Maximal and minimal weak solutions for elliptic problems with nonlinearity on the boundary*  
**Shalmali Bandyopadhyay\***, University of Tennessee at Martin (1203-35-44980)
- 3:00PM  
(81.5) *Weighted nonlocal operators and their applications in labeled learning*  
**Qiang Du**, Columbia University and **James M. Scott\***, Columbia University (1203-45-45136)
- 3:30PM  
(81.6) *Radial basis function methods for time-dependent fractional PDEs*  
**Qiao Zhuang\***, University of Missouri-Kansas City (1203-65-42024)
- 4:00PM  
▶ (81.7) *Asymptotically Compatible Schemes for Nonlocal Saddle Point Problems*  
**Zhaolong Han\***, University of California San Diego and **Xiaochuan Tian**, University of California, San Diego (1203-45-44724)
- 4:30PM  
▶ (81.8) *Quasistatic nonlocal mechanics and existence of unique solution in the presence of damage*  
**Nuwanthi Namali Samarawickrama\***, Louisiana State University and **Robert Lipton**, Louisiana State University (1203-45-40755)

**(82) AMS Special Session on Topological Data Analysis: Theory and Applications, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 620, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Jose A. Velez-Marulanda**, Valdosta State University  
**Shaun Van Ault**, Valdosta State University

- 1:00PM  
▶ (82.1)  *$SG$ -Mapper: Learning a Cover in the Mapper Construction*  
**Enrique Guadalupe Alvarado**, UC Davis, **Robin Belton**, Vassar College, **Emily Fischer**, Umqua Bank, **Kang-Ju Lee\***, Seoul National University, **Sourabh Palande**, Department of Computational Mathematics, Science & Engineering, Michigan State University, **Sarah Percival**, University of New Mexico and **Emilie Purvine**, Pacific Northwest National Laboratory (1203-55-45286)
- 1:30PM  
▶ (82.2)  *$sk$ -means considered harmful: arbitrary topological changes in uses of the Mapper algorithm*

**Mikael Vejdemo-Johansson\***, CUNY College of Staten Island (1203-55-36638)

- 2:00PM  
▶ ◆ (82.3) *Computing the Bottleneck Distance from Every Direction*  
**Elena Xinyi Wang\***, Michigan State University, **Elizabeth Munch**, Michigan State University and **Carola Wenk**, Tulane University (1203-55-37024)
- 2:30PM  
◆ (82.4) *Kernel Methods on Metric Measure Spaces: Applications to Diffusion Maps, Weight Functions, and Magnitude*  
**Yemeen Ayub\***, George Mason University and **Tyrus Berry**, George Mason University (1203-62-43491)
- 3:00PM  
(82.5) *Homological Bifurcations in Probabilistic Descriptions of Dynamical Systems*  
**Sunia Tanweer\***, Michigan State University and **Firas Khasawneh**, Michigan State University (1203-37-44618)
- 3:30PM  
(82.6) *Topologically Driven Data Assimilation*  
**Maxwell M Chumley\***, Michigan State University and **Firas Khasawneh**, Michigan State University (1203-55-44794)
- 4:00PM  
▶ (82.7) *Persistent homology with  $k$ -nearest-neighbor filtrations reveals topological convergence of PageRank*  
**Minh QUANG LE\***, Ho Chi Minh city Open University (1203-55-41847)
- 4:30PM  
(82.8) *Efficient Computation of Persistent Laplacians*  
**Benjamin Daniel Jones\***, Michigan State University and **Guowei Wei**, Michigan State University (1203-55-43354)

**(83) AMS Special Session on Topological Machine Learning, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 607, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Brett Jefferson**, Pacific Northwest National Laboratory  
**Emilie Purvine**, Pacific Northwest National Laboratory  
**Branden Stone**, Georgia Tech Research Institute  
**Stephen J Young**, Pacific Northwest National Laboratory

- 1:00PM  
▶ (83.1) *Two Households, Both Alike In Dignity: Geometry and Topology in Machine Learning*  
**Bastian Rieck\***, University of Fribourg (1203-55-40094)
- 1:30PM  
▶ (83.2) *Topological Insights into the Evolution of Scientific Knowledge*  
**Gavin Engelstad\***, Macalester College, **Russell Funk**, University of Minnesota, **Lucia Luo**, Macalester College, **Frances Claire McConnell**, Macalester College, **Jason Owen-Smith**, University of Michigan, **Ethan Scheelk**, Macalester College and **Lori Beth Ziegelmeier**, Macalester College (1203-55-42333)

- 2:00PM (83.3) *Time-Aware Knowledge Representations of Dynamic Objects with Multidimensional Persistence*  
**Baris Coskunuzer\***, UT Dallas (1203-55-39534)
- 2:30PM (83.4) *A TML Yarn: The Topological Data Analysis Machine Learning Algorithm (TDAML) and its Emerging Progeny of Efficacious Implementations*  
**Paul T. Schrader\***, Air Force Research Lab (AFRL), Information Directorate (1203-55-39933)
- 3:00PM (83.5) *Topological Autoencoders via Mapping Cylinders and Algebraic Losses*  
**Tanishq Bhatia\***, Northeastern University, **Arnur Nigmatov\***, Lawrence Berkeley National Laboratory and **Dmitriy Morozov\***, Lawrence Berkeley National Laboratory (1203-68-41066)
- 3:30PM (83.6) *Normalized Space Alignment: A Metric for Analysis of Representation Spaces*  
**Ambuj K Singh\***, University of California, Santa Barbara and **Danish Ebadulla\***, University of California, Santa Barbara (1203-68-44233)
- 4:00PM (83.7) *Data Classification and Tverberg-Type Theorems*  
**Jesus A. De Loera\***, Dept. of Mathematics, Univ. California (1203-52-45726)
- 4:30PM (83.8) *Topological Approaches to Navy Relevant Problems*  
**Erin Mae Hausmann\***, Naval Information Warfare Center Pacific (1203-55-40025)

***(84) AMS Special Session on Topological, Algebraic, and Geometric Methods for Safe, Robust, and Explainable Machine Learning, II***

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 613, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Tegan Emerson\***, Pacific Northwest National Laboratory  
**Tim Doster\***, Pacific Northwest National Lab  
**Scott Mahan\***, University of California, San Diego  
**Sarah McGuire\***, Michigan State University  
**Henry Kvinge\***, Pacific Northwest National Laboratory
- 1:00PM (84.1) *Uniform convergence guarantees for adversarially robust learning*  
**Rachel Morris\***, North Carolina State University and **Ryan W. Murray\***, North Carolina State University (1203-68-44530)
- 1:30PM (84.2) *Convergence rates for deterministic generative diffusion models.*  
**Matt Jacobs\***, UCSB (1203-35-44349)
- 2:00PM (84.3) *ReLU transformers and piecewise polynomials*  
**Zehua Lai\***, University of Texas at Austin, **Lek-Heng Lim\***, University of Chicago and **Yucong Liu\***, Georgia Institute of Technology (1203-68-41124)

- 2:30PM (84.4) *POLICE: Provable Linear Constraint Enforcement for Deep Networks*  
**Randall Balestriero\***, Brown University (1203-57-44632)
- 3:00PM *Break*
- 3:30PM (84.6) *Critical points of ReLU neural networks: Analytics and Empirics*  
**Marissa Masden\***, University of Puget Sound (1203-57-42962)
- 4:00PM (84.7) *Oblique Randomized Decision Trees and Dimension Reduction*  
**Eliza O'Reilly\***, Johns Hopkins University, **Ricardo Baptista\***, Caltech and **Yangxinyu Xie\***, The University of Texas at Austin (1203-60-43553)
- 4:30PM (84.8) *An interpretation for the role of depth in a deep neural network*  
**Patricia Munoz Ewald\***, University of Texas at Austin and **Thomas Chen\***, University of Texas at Austin (1203-68-41213)

***(85) AMS-SIMODE Special Session on Modeling Matters in Teaching and Learning Differential Equations, II***

WEDNESDAY, JANUARY 08 1:00PM–5:00PM Chelan 4, Level 2, Seattle Convention Center Arch at 800 Pike

- Organizers: **Kyle T Allaire\***, Worcester State University  
**Lisa Naples\***, Fairfield University  
**Pushpi Paranamana\***, Saint Mary's College  
**Brian Winkel\***, SIMIODE
- 1:00PM (85.1) *Critical Roles in Differential Equations*  
**Corban Harwood\***, George Fox University (1203-97-42051)
- 1:30PM (85.2) *Enhancing Differential Equations Instruction through a Discrete Mathematics Lens*  
**Laura Yang\***, University of Central Florida (1203-101-45565)
- 2:00PM (85.3) *A graphical approach to teaching 1D differential equations to biologists*  
**Duane Q. Nykamp\***, University of Minnesota (1203-97-44802)
- 2:30PM (85.4) *Enhancing communication skills through differential equation modeling projects*  
**Christine Sample\***, Emmanuel College, Boston, MA (1203-101-44605)
- 3:00PM (85.5) *Modeling Real World Systems with Differential Equations through Project Based Learning*  
**Daniel Colgan\***, United State Military Academy (1203-101-43190)
- 3:30PM (85.6) *Enhancing Learner Ownership and Competence: The Relevance of Differential Equations in STEM Academic Curricula*  
**Virgil C Ganescu\***, York College of Pennsylvania (1203-101-36636)
- 4:00PM (85.7) *Leslie meets Prey and Predators: From Modeling to Research*

Steven Joel Miller\*, Williams College (1 203-97-42682)

4:30PM  
▶ (85.8) *10 Iterations of Modeling the Physical World*  
**Nathan Pennington\***, Creighton University (1203-34-36833)

***Association for Symbolic Logic Tutorial II: Tropical geometry, logarithmic limits and o-minimality***

**WEDNESDAY, JANUARY 08 1:00PM–2:00PM 2A, Level Two, Seattle Convention Center Arch at 705 Pike**

The ASL Tutorial showcases interactions and connections between logic and other areas of mathematics. The two lecture tutorial is aimed at wide audience of mathematicians and does not assume technical background knowledge in logic.

Organizers: **David Reed Solomon**, University of Connecticut  
**Sergei Starchenko**, University of Notre Dame

***(86) AWM Special Session on Women in Mathematical Biology, II***

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 4C-1, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizers: **Karin Leiderman**, University of North Carolina at Chapel Hill  
**Robyn Shuttleworth**, Altos Labs  
**Lihong Zhao, PhD**, Virginia Tech  
**Christina Edholm**, Scripps College  
**Hwayeon Ryu**, Elon University

1:00PM  
▶ ◆ (86.1) *Understanding antibody magnitude and durability following vaccination against SARS-CoV-2*  
**Quiyana M. Murphy\***, Virginia Tech, Virginia Tech Center for the Mathematics of Biosystems, **George K Lewis**, Institute of Human Virology, University of Maryland School of Medicine, **Mohammad M Sajadi**, Institute of Human Virology, University of Maryland School of Medicine, **Jonathan Erwin Forde**, Hobart and William Smith Colleges and **Stanca Ciupe**, Virginia Tech (1203-92-41626)

1:30PM  
▶ (86.2) *Applications and Modelling in Fluids and overlap to Undergraduate Research Experiences*  
**Eva Marie Strawbridge\***, James Madison University, **Amy Buchmann**, University of San Diego and **Longhua Zhao**, Case Western Reserve University (1203-92-45091)

2:00PM  
▶ (86.3) *Exploring the role of the extracellular matrix during tissue rejuvenation*  
**Robyn Shuttleworth\***, Altos Labs and **Simone Bianco**, Altos Labs (1203-92-42030)

2:30PM  
▶ ◆ (86.4) *Cell-Cell Fusion in Cancer: Key Genomic Features and In Silico Tumor Evolutionary Behaviors*  
**Paulameena Visha Shultes\***, Cleveland Clinic, Case Western Reserve University, School of

Medicine, **Dagim Shiferaw Tadele**, Department of Molecular Cell Biology, Institute for Cancer Research, The Norwegian Radium Hospital, Oslo, Norway, **Arda Durmaz**, Cleveland Clinic and **Jacob G Scott**, Cleveland Clinic (1203-92-45049)

3:00PM  
▶ ◆ (86.5) *Designing Phage Cocktails for Combating Antibiotic-Resistant Bacteria Infections: a data-driven mathematical approach*  
**Qimin Huang\***, The College of Wooster (1203-92-44676)

3:30PM  
▶ (86.6) *Impulsive Differential Equation Models of Radiation Therapy*  
**Abigail D'Ovidio Long\***, University of Nebraska-Lincoln, Connecticut College and **Bo Deng**, University of Nebraska - Lincoln (1203-92-39051)

4:00PM  
▶ (86.7) *On the control of stage-structured populations*  
**Swati Patel\***, Oregon State University (1203-92-42568)

4:30PM  
▶ (86.8) *A Proposed Mathematical Model to Understand Rhizobium Legume Symbiosis*  
**Meghan Peltier\***, Florida State University (1203-34-39450)

***(87) BSM Special Session: Mathematical Research in Budapest for Students and Faculty***

**WEDNESDAY, JANUARY 08 1:00PM–5:00PM 616, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizer: **Kristina Cole Garrett**, Budapest Semesters in Mathematics

1:00PM  
▶ (87.1) *Lessons in graph limits, exposition, and discovery*  
**Vilas Winstein\***, University of California, Berkeley (1203-103-42982)

1:30PM  
▶ (87.2) *Languages, Alphabets, and Group Theory*  
**Dr. Gizem Karaali\***, Pomona College (1203-20-44459)

2:00PM  
▶ (87.3) *Optimizing Fixed Direction Sets for Unit Distance Graph Construction*  
**Oscar Elijah Bender-Stone\***, University of Colorado Boulder, **Joseph Campbell**, Georgia Institute of Technology, **Nathan Hart-Hodgson**, Boston College, **Hao Zou**, University of Wisconsin Madison and **Pál Zsámoki**, Alfréd Rényi Institute of Mathematics (1203-05-42887)

2:30PM  
▶ (87.4) *Ramsey Theory on the Integer Grid: The "L"-Problem*  
**Will Smith**, University of South Carolina and **Carl R Yerger\***, Davidson College (1203-05-41590)

3:00PM  
▶ (87.5) *Planar Tur\{a\}n Numbers of Intersecting Cycles*  
**Ervin Györi**, Central European University, Alfréd Rényi Institute of Mathematics, **William Paschel**, Georgia Institute of Technology, **Yang Tan**, Carleton College and **Mengyuan Yang\***, Swarthmore College (1203-05-45357)

- 3:30PM  
▶ (87.6) *Stability Theorems for Forbidden Configurations*  
**Benjamin Kreiswirth\***, University of Chicago,  
**Bowen Li**, University of Illinois Urbana-Champaign and **Attila Sali**, Alfréd Rényi Institute of Mathematics (1203-05-42361)
- 4:00PM  
▶ (87.7) *Artificial Intelligence and Unit Distance Graphs*  
**Elan Roth\***, University of Pennsylvania - Budapest Semester in Mathematics (1203-90-41126)
- 4:30PM  
▶ (87.8) *How nonunique is your factorization?*  
**Paul P Pollack\***, University of Georgia (1203-11-41474)

**(88) CRM-PIMS-AARMS Special Session on Indigenous Voices in Mathematics, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 615, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Kamuela E. Yong**, University of Hawai'i-West O'ahu

- 1:00PM  
▶ ♦ (88.1) *Indigenous Mathematical Knowledge Strengthens Student's Identity*  
**Donna Lee Fernandez\***, Alliance of Indigenous Math Circles (1203-101-45052)
- 1:30PM  
▶ ♦ (88.2) *Rooting Work in Mathematics Education at Tribal Colleges and Universities*  
**Belin Tsinnajinnie\***, WestEd, **Lisa Savcak**, WestEd, **Haley McNamara**, WestEd and **Katie D'Silva**, WestEd (1203-97-44726)
- 2:00PM  
▶ ♦ (88.3) *Overview of an established undergraduate summer math research program at the University of Guam*  
**Leslie Aquino\***, University of Guam and **Hyunju Oh**, University of Guam (1203-97-44402)
- 2:30PM  
▶ ♦ (88.4) *Working With Community Partners: Advocating for Those You Want to do Research With*  
**Joseph Edward Hibdon\***, Northeastern Illinois University (1203-103-44199)
- 3:00PM  
▶ ♦ (88.5) *Calculus with Infinitesimals: Simplifying Computations and Improving Understanding Using the Approximation Relation*  
**C Bryan Dawson\***, Union University (1203-97-39925)
- 3:30PM  
▶ ♦ (88.6) *Tropicalizing Moduli Spaces of Graphically Stable Curves*  
**Andy Fry\***, Lewis & Clark College (1203-14-45223)
- 4:00PM  
▶ (88.7) *From Groups to Quantum Groups and Their Operator Algebras*  
**Benjamin Anderson-Sackaney\***, University of Saskatchewan (1203-46-45455)
- 4:30PM  
▶ ♦ (88.8) *Symmetries of Surfaces*  
**Marissa Kawehi Loving\***, University of Wisconsin Madison (1203-57-43482)

**(89) ILAS Special Session on Matrix Analysis and Applications, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 211, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Mohsen Aliabadi**, Iowa State University  
**Luyining Gan**, Beijing University of Posts and Telecommunications  
**Tin-Yau Tam**, University of Nevada Reno

- 1:00PM  
(89.1) *Relations between matrix means*  
**Luyining Gan\***, Beijing University of Posts and Telecommunications (1203-15-42520)
- 1:30PM  
▶ (89.2) *Quaternion Grassmannians for Color Image Set Recognition*  
**Xiang Xiang Wang\***, University of Nevada, Reno (1203-15-40342)
- 2:00PM  
(89.3) *Identifiability of linear compartmental tree models*  
**Cash Bortner**, California State University, Stanislaus, **Elizabeth Gross\***, University of Hawai'i at Manoa, **Nicolette Meshkat**, Santa Clara University, **Anne Shiu**, Texas A&M University and **Seth Sullivant**, North Carolina State University (1203-15-42799)
- 2:30PM  
(89.4) *Multi-variable Wasserstein Means of Positive Definite Operators*  
**Vatsalkumar N. Mer\***, Postdoctoral researcher, Chungbuk National University, South Korea and **Sejong Kim**, Chungbuk National University (1203-47-44427)
- 3:00PM  
▶ (89.5) *Extensions of Yamamoto-Nayak's Theorem*  
**Huajun Huang\***, Auburn University (1203-15-42218)
- 3:30PM  
▶ ♦ (89.6) *Utilizing the Friedrichs angle to estimate the smallest positive eigenvalue of sum of PSD matrices*  
**Avleen Kaur\***, The University of British Columbia, **Stephen Kirkland**, University of Manitoba and **Shaun Lui**, University of Manitoba (1203-15-44554)
- 4:00PM  
▶ (89.7) *Matrix and tensor computations under field extensions*  
**Ke Ye\***, Chinese Academy of Sciences (1203-15-42751)
- 4:30PM  
(89.8) *Complexity of finding tensor ranks*  
**Mohsen Aliabadi\***, University of California, San Diego (1203-15-41935)

**(90) ILAS Special Session on Strong Properties of Matrix Classes, II**

WEDNESDAY, JANUARY 08 1:00PM–5:00PM 204, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Minerva Catral**, Xavier University  
**Bryan L Shader**, University of Wyoming

- 1:00PM  
▶ (90.1) *Strong properties from a universal point of view*  
**Jephian C.-H Lin\***, National Sun Yat-sen University (1203-15-41588)

- 2:00PM  
▶ (90.2) *Nonsymmetric Strong Properties*  
**Colin Garnett**<sup>\*</sup>, Black Hills State University, **Kevin Vander Meulen**, ACMS, **Bryan A Curtis**, Iowa State University and **Bryan L Shader**, University of Wyoming (1203-15-41140)
- 2:30PM  
(90.3) *The strong nullity interlacing property*  
**Mary Flagg**<sup>\*</sup>, University of St. Thomas (1203-05-42349)
- 3:00PM  
(90.4) *Strong Singular Value Property for Matrices*  
**Caleb J. Cheung**<sup>\*</sup>, University of Wyoming and **Bryan L Shader**, University of Wyoming (1203-15-41263)
- 3:30PM  
(90.5) *A topological class of signed graphs*  
**Dr. Hein Van Der Holst, PhD.**<sup>\*</sup>, Georgia State University (1203-05-44261)
- 4:00PM  
(90.6) *Leaky Zero Forcing on Unicyclic Graphs and Generalized Petersen Graphs*  
**Beth Bjorkman**, Air Force Research Laboratory, **Lei Cao**, Nova Southeastern University, **Franklin Kenter**, United States Naval Academy, **Ryan Moruzzi Jr**, CSU East Bay, **Carolyn Reinhart**, Swarthmore College and **Violeta Vasilevska**<sup>\*</sup>, Utah Valley University (1203-05-44011)
- 4:30PM  
(90.7) *Matroid adjoints and bounds for matrix minimum rank*  
**Louis Deaett**<sup>\*</sup>, Quinnipiac University and **Kevin Grace**, University of South Alabama (1203-15-44209)

### JMM Workshop: Developing Online Mathematics Courses: Strategies to Consider

WEDNESDAY, JANUARY 08 1:00PM–2:30PM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike

This workshop will focus on key factors that must be considered while designing and developing an online course that is student-oriented, engaging and accessible. As Artificial Intelligence is becoming a part of student learning, adaptive courseware(s) provide a multi-prong method for learning, assessment and teaching in online settings. Presenters will highlight key opportunities to support online mathematics learning through existing AI-based adaptive courseware.

Organizers: **Pamela Bryan Williams**, Chief Strategist | Learning Design and Development Maryville University | School of Adult & Online Education  
**Sharmila Sivalingam**, Maryville University of St. Louis

### MAA Project NEXT: The Mentor Mosaic - Piecing Together Strategies for Advising Undergraduates

WEDNESDAY, JANUARY 08 1:00PM–2:15PM 609, Level Six, Seattle Convention Center Arch at 705 Pike

This session brings together experienced mentors from diverse academic institutions, including R1 research universities, liberal arts colleges, and engineering schools, to share strategies and best practices for mentoring and advising undergraduates. Through a guided panel

discussion, participants will explore different approaches to fostering a supportive environment inside and outside the classroom, structuring accessible projects, and addressing challenges faced by undergraduate mentees.

Organizers: **Sahana Balasubramanya**, Lafayette College  
**Emma Cobian**, Rose-Hulman Institute of Technology  
**Robert Deyeso**, University of Iowa  
**Michael Baker**, University of Kentucky  
**Sellenne Bañuelos**, California State University Channel Islands  
**Jason Devito**, University of Tennessee at Martin  
**MurphyKate Montee**, Carleton College  
**Derek Smith**, Lafayette College

### (91) MAA Special Session on Fostering Creativity in Undergraduate Mathematics Courses, I

WEDNESDAY, JANUARY 08 1:00PM–6:00PM 619, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Gulden Karakok**, University of Northern Colorado  
**Gail Tang**, University of La Verne  
**Houssein El Turkey**, University of New Haven  
**Emily Cilli-Turner**, University of San Diego  
**Visala Rani Satyam**, Virginia Commonwealth University  
**Milos Savic**, University of Oklahoma

- 1:00PM  
▶ (91.1) *Capturing Creativity and Social Activity in Assessments with Silent Group Exams*  
**Aaron D Wangberg**<sup>\*</sup>, Winona State University (1203-101-44505)
- 1:30PM  
▶ (91.2) *Student Driven Learning in Linear Optimization*  
**Tien Chih**<sup>\*</sup>, Oxford College of Emory University (1203-101-40281)
- 2:00PM  
▶ (91.3) *Creativity in Different Undergraduate Mathematics Courses: Two Project to Ponder - All About That Base and Perfect Cuppa Tea*  
**Sarah Kerrigan**<sup>\*</sup>, George Fox University (1203-101-45014)
- 2:30PM  
▶ (91.4) *Commognition and Creativity: Cultivating Mathematical Discourse through Creativity Tasks*  
**Abraham Edwards**<sup>\*</sup>, Michigan State University (1203-97-42260)
- 3:00PM  
▶ (91.5) *Creativity in the Classroom: From Task Development to Assessment and Adaptation*  
**Emily Hendryx Lyons**<sup>\*</sup>, University of Central Oklahoma and **Liz Lane-Harvard**, University of Central Oklahoma (1203-97-43528)
- 3:30PM  
▶ (91.6) *Embracing creativity and diverse assessments in an undergraduate mathematical modeling course*  
**Elizabeth Arnold**<sup>\*</sup>, Montana State University (1203-101-42484)

- 4:00PM  
▶ (91.7) *How Coding and Computation Can Open Doors for Mathematical Creativity*  
**Sarah Dorothy Castle**<sup>\*</sup>, University of Idaho (1203-97-45326)
- 4:30PM  
▶ (91.8) *Observing Problem-Solving Strategies in General Education Mathematics Courses*  
**Christopher Oehrlein**<sup>\*</sup>, Oklahoma City Community College (1203-101-41658)
- 5:00PM  
▶ (91.9) *Soliciting the Student Perspective on Collaborative Mathematical Creativity*  
**Amanda Lake Heath**<sup>\*</sup>, University of Houston - Downtown (1203-97-40350)
- 5:30PM  
▶ (91.10) *Classroom Strategies for Facilitating Growth of Creative Skills Among STEM Undergraduates*  
**Malgorzata Aneta Marciniak**<sup>\*</sup>, City University of New York, LaGuardia CC (1203-97-45438)

**Professional Enhancement Program (PEP) 1A:  
Building Conceptual Understanding of  
Multivariable Calculus using 3D Visualization in  
CalcPlot3D and 3D-Printed Surfaces**

WEDNESDAY, JANUARY 08 1:00PM–3:00PM Willow A, Second Floor, Sheraton Grand Seattle

Organizers: **Shelby Stanhope**, U.S. Air Force Academy  
**Paul E. Seeburger**, Monroe Community College

**Professional Enhancement Program (PEP) 2A:  
Leveraging GitHub and AI for Mathematics  
Research and Teaching**

WEDNESDAY, JANUARY 08 1:00PM–3:00PM Willow B, Second Floor, Sheraton Grand Seattle

Organizers: **Oscar Levin**, University of Northern Colorado  
**Steven Craig Clontz**, University of South Alabama

**(92) SIAM Minisymposium on Modern Uncertainty  
Quantification in Theory and in Practice**

WEDNESDAY, JANUARY 08 1:00PM–6:00PM 2B, Level Two, Seattle Convention Center Arch at 705 Pike

Organizer: **Amy Braverman**, Jet Propulsion Laboratory (Caltech)

1:00PM  
▶ ◆ (92.1) *Veridical data science and PCS uncertainty quantification*  
**Bin Yu**<sup>\*</sup>, Statistics and EECS, University of California at Berkeley (1203-62-40789)

1:50PM  
▶ (92.2) *From Displacements to Distributions and Population-Informed Priors*  
**Troy Butler**<sup>\*</sup>, University of Colorado Denver (1203-65-37984)

2:40PM  
▶ (92.3) *Bayesian hierarchical models for distributed Tikhonov regularization: a computationally efficient method for underdetermined problems*  
**Daniela Calvetti**<sup>\*</sup>, Case Western Reserve University and **Erkki Somersalo**, Case Western Reserve University (1203-65-44434)

3:30PM  
▶ (92.4) *Data thinning and its applications*  
**Daniela Witten**<sup>\*</sup>, University of Washington (1203-62-37868)

4:20PM  
▶ (92.5) *Fast sampling from Gaussian posteriors by subspace splitting, with application to non-linear problems*  
**Erkki Somersalo**<sup>\*</sup>, Case Western Reserve University (1203-65-45038)

5:10PM  
▶ (92.6) *CANCELLED Uncertainty, probability, and models*  
**Philip B Stark**<sup>\*</sup>, University of California, Berkeley (1203-62-43247)

**(93) SIGMAA Special Session on Undergraduate  
Research Activities in Mathematical and  
Computational Biology, I**

WEDNESDAY, JANUARY 08 1:00PM–4:00PM 610, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Anne E. Yust**, University of Pittsburgh  
**Erin N Bodine**, Rhodes College  
**Timothy D Comar**, Benedictine University

1:00PM  
▶ (93.1) *Dynamics of neural coincidence detection in auditory brainstem neurons*  
**Joshua H Goldwyn**<sup>\*</sup>, Swarthmore College (1203-92-43405)

1:30PM  
▶ (93.2) *Mathematical Model for Tuberculosis with COPASI*  
**Maggie Ha**<sup>\*</sup>, University of Houston Downtown (1203-92-38444)

2:00PM  
▶ (93.3) *Modeling, quantifying, and predicting the impact of self-quarantine and vaccination on mpox spread in the United States*  
**Olivia Jessica Chu**<sup>\*</sup>, Bryn Mawr College (1203-92-45531)

2:30PM  
▶ ◆ (93.4) *Quantifying the Transmission of *Clostridioides difficile*: Mathematical Models of Transmission and Control in Hospitals*  
**Cara Sulyok**<sup>\*</sup>, Lewis University, **Brittany Stephenson**, Lewis University, **Malen De la Fuente Arruabarrena**, Lewis University, **Kristen Ess**, Lewis University, **Ethan Jakubowski**, Lewis University, **Austin Kind**, Lewis University, **Maximus Lewis**, Lewis University, **Laila Mahrat**, Lewis University, **Matthew Senese**, University of Notre Dame and **Justyna Sliwinska**, University of Illinois Chicago (1203-92-43891)

3:00PM  
▶ ◆ (93.5) *Stochastically Simulating Disease Spread in Assisted Living Facilities*  
**Brittany Stephenson**, Lewis University, **Alli Brophy**<sup>\*</sup>, Winthrop University, **Andres Castellanos**, Sonoma State University, **Bryce Iverson**, Sonoma State University, **Danielle Murphy**, University of California, Berkeley, **Austin Kind**, Lewis University, **Matthew Senese**, University of Notre Dame and **Cara Sulyok**, Lewis University (1203-92-43443)

3:30PM *Starting and growing an interdisciplinary research program at an R2 institution*  
▶ (93.6) **Rachael L Miller Neilan**<sup>\*</sup>, Duquesne University (1203-92-42786)

**(94) SLMath (MSRI) Special Session on Metric Geometry and Topology, II**

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WEDNESDAY, JANUARY 08 1:00PM–5:00PM 611, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Catherine Searle**, Wichita State University  
**Christine M. Escher**, Oregon State University

1:00PM *A magnetic version of E. Hopf's theorem*  
◆ (94.1) **Valerio Assenza**, Instituto de Matemática Pura e Aplicada, **James Marshall Reber**, The Ohio State University and **Ivo Terek**<sup>\*</sup>, Williams College (1203-53-38382)

1:30PM *Extended Ambient Obstruction Solitons*  
◆ (94.2) **Erin Griffin**<sup>\*</sup>, Northwestern University, **Rahul Poddar**, Harish Chandra Research Institute, India, **Ramesh Sharma**, University of New Haven and **William Wylie**, Syracuse University (1203-53-40952)

2:00PM *CANCELLED Optimal partial transport for metric pairs*  
▶ ◆ (94.3) **Mauricio Adrian Che Moguel**<sup>\*</sup>, Durham University (1203-53-40893)

2:30PM *Gromov–Hausdorff continuity of non-Kähler Calabi–Yau conifold transitions*  
(94.4) **Benjamin Friedman**<sup>\*</sup>, The University of British Columbia, **Sébastien Picard**, The University of British Columbia and **Caleb Swan**, The University of British Columbia (1203-53-41202)

3:00PM *Short Simple Orthogonal Geodesic Chords*  
◆ (94.5) **Isabel Beach**<sup>\*</sup>, University of Toronto (1203-53-42377)

3:30PM *Riemannian 3-spheres that are hard to sweep out by short curves*  
▶ ◆ (94.6) **Omar Hassan Alshawa**<sup>\*</sup>, University of Toronto and **Herng Yi Cheng**, University of Toronto (1203-53-42467)

4:00PM *Characterization of almost complex manifolds with Betti numbers concentrated in the middle dimension*  
(94.7) **Zhixu Su**<sup>\*</sup>, University of Washington (1203-57-43271)

4:30PM *Cobordism Obstructions to Complex Sections*  
(94.8) **Dennis Nguyen**<sup>\*</sup>, Univ of Oregon (1203-57-43866)

**(95) TPSE Contributed Paper Session on Transformation Models for Inclusive Student Experiences, II**

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WEDNESDAY, JANUARY 08 1:00PM–5:00PM 618, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Aris Winger**, Georgia Gwinnett College  
**Omayra Ortega**, Sonoma State University

**Luis Antonio Leyva**, Vanderbilt University-Peabody College of Education & Human Development

**Brigitte Lahme**, Sonoma State University  
**Abbe Herzig**, American Mathematical Society  
**Michael Dorff**, Brigham Young University  
**Ben Ford**, Sonoma State University

1:00PM *STEM at a Tipping Point*  
▶ ◆ (95.1) **Omayra Ortega**<sup>\*</sup>, Sonoma State University, **Brigitte Lahme**, Sonoma State University, **Ben Ford**, Sonoma State University and **Luis Antonio Leyva**, Vanderbilt University - Peabody College of Education & Human Development (1203-104-44814)

1:30PM *TIPS towards Justice: Using Student Responses to Ignite Faculty Professional Development*  
▶ ◆ (95.2) **Aris Winger**<sup>\*</sup>, Georgia Gwinnett College (1203-103-44316)

2:00PM *Rehumanizing Mathematics through Lesson Study*  
▶ (95.3) **Ben Ford**<sup>\*</sup>, Sonoma State University (1203-101-45289)

2:30PM *Exploring First Generation College Student Identity in Introductory Statistics*  
▶ (95.4) **Martha Shott**<sup>\*</sup>, Sonoma State University (1203-104-44729)

3:00PM *Including Student Experiences in the Curriculum - a Lesson Study in Calculus*  
▶ (95.5) **Brigitte Lahme**<sup>\*</sup>, Sonoma State University (1203-101-43994)

3:30PM *Discussion*

3:45PM *CANCELLED An Analysis of Culturally-Affirming Features of Instruction in Introductory Mathematics Courses for Latin\* Student STEM Success at a Hispanic-Serving Institution*  
▶ ◆ (95.7) **Luis Antonio Leyva**<sup>\*</sup>, Vanderbilt University - Peabody College of Education & Human Development (1203-97-43353)

4:15PM *CANCELLED A Research, Design, and Entrepreneurship-Focused Interdisciplinary, Problem-Based STEM Curriculum.*  
▶ (95.8) **Vinodh Kumar Chellamuthu**<sup>\*</sup>, Utah Tech University, **Aaron Davis**, Utah Tech University, **Wendy Schatzberg**, Utah Tech University and **Samuel Tobler**, Utah Tech University (1203-104-45540)

**(96) AMS Special Session on Modeling Natural Resources, II**

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WEDNESDAY, JANUARY 08 1:30PM–5:00PM Skagit 2, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Shandelle Henson**, Andrews University  
**Catherine A Roberts**, COMAP

1:30PM *Modeling the impact of temperature during nesting on Loggerhead sea turtles*  
▶ (96.1)

**Suzanne Marie Lenhart**<sup>\*</sup>, University of Tennessee, Knoxville (1203-92-38014)

2:00PM  
▶ (96.2) *Bayesian models reveal endangered Antarctic blue whale population is increasing but still far from pre-whaling levels*

**Zoe R. Rand**<sup>\*</sup>, Quantitative Ecology and Resource Management, University of Washington and **Trevor A. Branch**, School of Aquatic and Fishery Sciences, University of Washington (1203-92-37964)

2:30PM  
▶ ◆ (96.3) *Unraveling the Effects of Fungicides on Honey Bee Populations: A Mathematical Modeling with Seasonality*

**Jun Chen**<sup>\*</sup>, Arizona State University, **Gloria Hoffman**, USDA-Carl Hayden Bee Research Center, **Jon Harrison**, Arizona State University, **Jennifer Fewell**, Arizona State University and **Yun Kang**, Arizona State University (1203-92-44992)

3:00PM  
▶ (96.4) *Dispersal Driven Coexistence in a Multi Patch Competition Model for Zebra and Quagga Mussels*

**Paul Leonard Salceanu**<sup>\*</sup>, University of Louisiana at Lafayette, **Qihua Huang**, Southwest University, Chongqing, China and **Hao Wang**, University of Alberta (1203-92-42899)

3:30PM  
▶ (96.5) *A mathematical model of Dermo disease in oyster population*  
**Najat Ziyadi**<sup>\*</sup>, Morgan State University (1203-92-44652)

4:00PM  
▶ (96.6) *Optimal Sustainable Management of the Horse Mackerel Harvesting in the Southern Black Sea Coast*  
**Maruf A Lawal**<sup>\*</sup>, University of Tennessee (1203-92-38027)

4:30PM  
▶ (96.7) *A switch point algorithm applied to a harvesting problem*  
**Summer Rebecca Atkins**<sup>\*</sup>, University of Alabama in Huntsville, **W. Hager**, Professor at University of Florida Department of Mathematics and **Maia Nenkova Martcheva**, University of Florida (1203-49-40066)

### ***PME Panel: What Every Student Should Know about the JMM***

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WEDNESDAY, JANUARY 08 1:30PM–2:30PM 4C-4, Level Four, Seattle Convention Center Arch at 705 Pike

Navigating a large conference can be overwhelming, even for those who have previously attended such an event. Common questions may include: How do I get the most out of the program? What sessions are especially for students? What other events should I be on the lookout for? How can I get some cool, free math stuff? Students and their faculty mentors are encouraged to attend. This panel is sponsored by the Pi Mu Epsilon Mathematics Honorary Society.

Moderators: **Stephanie Edwards**, Hope College  
**Stephanie Edwards**, Hope College  
**Jennifer E Beineke**, Western New England University

**Shannon R Overbay**, Gonzaga University  
**Eli S Edwards-Parker**, Hope College  
**Valen Feldmann**, Hope College  
**Yiting Shen**, Hope College  
**Denise Taunton Reid**, Valdosta State University

### ***(97) AMS Invited Address - Mohammed Abouzaid, Stanford University***

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WEDNESDAY, JANUARY 08 2:10PM–3:15PM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

2:10PM  
▶ (97.1) *One Hundred Years of Morse Theory*  
**Mohammed Abouzaid**<sup>\*</sup>, Stanford University (1203-57-36482)

### ***AMS Committee on Equity, Diversity and Inclusion Panel Discussion: How Can the Mathematical Community Mitigate Bias and Other Equity, Diversity, and Inclusion Issues in AI***

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WEDNESDAY, JANUARY 08 3:00PM–4:30PM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike

The use of AI offers vast potential for transformation of society but also raises significant concerns for equity, diversity, and inclusion. This panel will address the topic of bias in AI broadly understood and with a focus on the role of both mathematics and mathematicians. The goal of the panel will be to discuss these issues to understand them better, to consider how mathematics can help to address them, and to build awareness in the mathematical community.

Organizers: **John M. Voight**, Dartmouth College  
**Jay-C Reyes**, Center for Communications Research-La Jolla  
**Darryl Yong**, Harvey Mudd College  
**Lily Khadjavi**, Loyola Marymount University  
**Sunipa Dev**, Google  
**Lara Kassab**, University of California, Los Angeles  
**Pang Wei Koh**, University of Washington

### ***AWM Business Meeting***

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WEDNESDAY, JANUARY 08 3:00PM–3:30PM 603, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Darla Kremer**, Association for Women in Mathematics

### ***JMM Panel on The Mathematics of Mass Incarceration***

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WEDNESDAY, JANUARY 08 3:00PM–4:30PM 4C-3, Level Four, Seattle Convention Center Arch at 705 Pike

Moderators: **Francis Edward Su**, Harvey Mudd College  
**Abbe Herzig**, TPSE-Math

**Aris Winger**, Georgia Gwinnett College  
**Johnny Le'Dell Pippins**, University of Iowa  
**Arlyss Herzig**, Brennan Center for Justice  
**Katherine Pearce**, North Carolina State University  
**Victor Piercey**, Ferris State University

***SIGMAA-UR Panel: Undergraduate Research in Mathematics for Addressing the Sustainable Development Goals in the Age of AI***

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WEDNESDAY, JANUARY 08 3:00PM–4:30PM 4C-4, Level Four, Seattle Convention Center Arch at 705 Pike

Undergraduate math research on the 17 UN Sustainable Development Goals (SDGs) in the AI era offers significant academic and skill-building opportunities. This panel explores the benefits and challenges of mentoring such projects, comparing them to traditional studies and emphasizing their job market relevance. It features educators experienced in AI-related sustainability research, providing insights and practical advice for faculty mentors.

Organizers: **Haseeb Kazi**, Trine University  
**Lauren L Rose**, Association for Women in Mathematics  
**Violeta Vasilevska**, Utah Valley University  
**Brandy S. Wieggers**, College of Idaho  
**Cara Sulyok**, Lewis University  
**Vinodh Kumar Chellamuthu**, Dixie State University  
**Padmanabhan Seshaiyer**, George Mason University  
**Aaron B Luttmann**, Simon Fraser  
**Hwayeon Ryu**, Elon University  
**Keisha Cook**, Tulane University

***MAA Project NEXT: Beyond Grades: Actionable Feedback for Growth***

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WEDNESDAY, JANUARY 08 4:30PM–5:45PM 609, Level Six, Seattle Convention Center Arch at 705 Pike

This workshop explores strategies for instructors providing actionable feedback to students. Participants will learn how to deliver constructive feedback that promotes student growth and understanding. The workshop also covers methods for training students to appreciate and adapt to this feedback-focused approach. Emphasis is placed on helping students view feedback as a tool for improvement and on best practices for clear communication and effective engagement with feedback.

Organizers: **Jacob Blazejewski**, Michigan Technological University  
**Praneel Samanta**, University of Kentucky  
**Jasmine Bhullar**, Tufts University  
**Victor Piercey**, Ferris State University

***Ribbon Cutting Ceremony***

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WEDNESDAY, JANUARY 08 4:30PM–4:45PM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

***Awards Celebration***

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WEDNESDAY, JANUARY 08 4:45PM–5:45PM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Boris Hasselblatt**, Tufts University

***Exhibits and Book Sales***

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WEDNESDAY, JANUARY 08 6:00PM–8:00PM Hall 4A, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

**Thursday, January 09**

***Joint Meetings Registration***

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THURSDAY, JANUARY 09 7:30AM–4:00PM Atrium Lobby, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

***JMM Nursing Parent Room - SCC***

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THURSDAY, JANUARY 09 7:30AM–4:00PM 508, Level Five, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

***(98) AMS Contributed Paper Session on Combinatorics, Graph Theory, Order, and General Algebraic Systems, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM 306, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

8:00AM  
▶ (98.1) *Hitomezashi Hypersurfaces*  
**Edwin Anthony Xie**<sup>\*</sup>, Stanford University (1203-05-43361)

8:15AM  
▶ (98.2) *An analysis of a bounded resource search puzzle*  
**Gopal Anantharaman**<sup>\*</sup>, KnotTheory.ai Inc. (1203-05-38423)

8:30AM  
▶ ♦ (98.3) *Number of valid mountain-valley assignments on the  $S_m \times nS$  Miura-ori*  
**Valentina Pappano**<sup>\*</sup>, Rutgers University, New Brunswick, **Kacey Yang**, University of California, Los Angeles, **Emma O'Neil**, Portland State University and **Lumi Christensen**, University of Pennsylvania (1203-05-38282)

8:45AM  
▶ (98.4) *On the lucky statistic of Fubini rankings*  
**Melissa Beerbower**, Loyola University Chicago, **Jennifer Elizabeth Elder**, Missouri Western State University, **Pamela Estephania Harris**, Williams College, **Lucy Martinez**, Rutgers University and **Grant Shirley**, East Tennessee State University (1203-05-41196)

9:00AM  
▶ (98.5) *Fubini rankings with a fixed set of lucky cars*  
**Melissa Beerbower**, Loyola University Chicago, **Jennifer Elizabeth Elder**, Missouri Western State University, **Pamela Estephania Harris**, Williams College, **Lucy Martinez**, Rutgers University and **Grant Shirley**, East Tennessee State University (1203-05-41201)

9:15AM  
▶ ♦ (98.6) *Homomesy of Parking Functions*  
**Jennifer Elizabeth Elder**, Missouri Western State University, **Pamela Estephania Harris**, Williams College, **Lucy Martinez**, Rutgers University and **Cyrus Young**, University of California, Irvine (1203-05-41204)

9:30AM  
▶ (98.7) *Generalizations of wreath product identities via Garsia-Gessel bijections*  
**Tingyao Xiong**, Radford University (1203-05-42263)

9:45AM  
▶ (98.8) *A Finite State Machine Approach to Enumerating Bounded Permutations*  
**Eric Redmon**, Marquette University and **Jay Pantone**, Marquette University (1203-05-45040)

10:00AM  
▶ (98.9) *Revisiting Dice Relabeling using Cyclotomic Polynomials*  
**George Nasr**, Augustana University (1203-05-40744)

10:15AM  
▶ (98.10) *CANCELLED -On the Bivariate Characteristic Polynomial of the Shuffle Lattices*  
**Annabel Ma**, Harvard University (1203-05-41762)

10:30AM  
▶ ♦ (98.11) *Bijections for Standard Young Tableaux with Fixed Major Index*  
**Gabriel Michael Chavez**, CSUMB, **Sarah Fisher**, California State University Monterey Bay and **Lipika Deka**, California State University, Monterey Bay (1203-05-42532)

10:45AM  
▶ (98.12) *Integer partitions and diagrams from African and Indian art*  
**Aidan Botkin**, Michigan Technological University and **Robert Schneider**, Michigan Technological University (1203-05-45567)

11:00AM  
▶ (98.13) *Using Geometric Shapes to count and classify types of Quads*  
**Diba Imran Imran Imran**, Bard College, **Husna Manalai**, Bard College, **Yueer Lin**, Bard College and **Zifan Xu**, Bard College (1203-05-45388)

11:15AM  
▶ (98.14) *The  $SkS$ -Cover Conjecture in the Game Quads*  
**Daniel Rose-Levine**, Bard College (1203-05-45605)

11:30AM  
(98.15) *Chordal graphs to matroids*

**James Dylan Douthitt**, Louisiana State University and **James Oxley**, Louisiana State University (1203-05-41779)

11:45AM  
▶ (98.16) *Maximal Packing of Axis Aligned Boxes with Fixed Stabbing Number*  
**Everett Sullivan**, Clayton State University (1203-05-43039)

### (99) AMS Contributed Paper Session on Mathematics Education, III

THURSDAY, JANUARY 09 8:00AM–11:45AM 307, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

8:00AM  
▶ (99.1) *Creative Mathematical Practice Through the Weierstrass Approximation Theorem*  
**Glen R. Van Brummelen**, Trinity Western University and **Wang-Hung Tse**, Trinity Western University (1203-97-45333)

8:15AM  
▶ (99.2) *A Data Science Framework for K-12 Education*  
**Anna Bargagliotti**, Loyola Marymount University (1203-97-43992)

8:30AM  
▶ (99.3) *Undergraduate Students' Statistical Literacy in Media Contexts*  
**Samuel Waters**, University of Northern Colorado (1203-97-42401)

8:45AM  
▶ (99.4) *Forecasting Housing Supply and Identifying Economic Determinants to Understand and Address Homelessness in the UK*  
**Devang Sharma**, University of California Los Angeles and **Adhvaith Sridhar**, University of Minnesota Twin Cities (1203-97-45732)

9:00AM  
▶ (99.5) *Math and the Moon: Using Mathematical Modeling to Resolve Scientific Misconceptions*  
**Hunter R Chandler**, University of Kentucky, Bluegrass Community & Technical College (1203-97-44821)

9:15AM  
▶ (99.6) *Teacher Knowledge and Perceptions of Computational Thinking and Computational Thinking Skills in 5th-Grade Mathematics*  
**Ellen James**, Texas Tech University (1203-97-37312)

9:30AM  
▶ (99.7) *Predicting High School Graduation using ELS: 2002 data*  
**Joaquin Estevez**, University of West Florida and **Achraf Cohen**, University of West Florida (1203-97-42855)

9:45AM  
▶ (99.8) *Students Perception of a Desmos Activity from Algebra to Calculus 3*  
**Candice M Quinn**, University of North Alabama, **Kinley Cook**, University of North Alabama and **Chloe Jackson**, University of North Alabama (1203-97-42298)

10:00AM  
▶ (99.9) *With a Little Help from My (Online) Friends: Undergraduate Students' Strategic Use of Online Resources to Study Mathematics*  
**Ander Erickson**, University of Washington Tacoma (1203-97-45027)

10:15AM *Promoting Students' Understanding of Experimental and Theoretical Probabilities with Programming*  
▶ (99.10) **Hyejin Park**<sup>\*</sup>, Drake University, **Eric D. Manley**, Drake University and **Samuel Trujillo**, Drake University (1203-97-45480)

10:30AM *A Video Game about Linear Systems*  
▶ ◆ (99.11) **Ali Balooch**<sup>\*</sup>, University of Nevada, Las Vegas (1203-97-42763)

***(100) AMS Special Session on Advances in Numerical Methods for Fluid Dynamics, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM 213, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Lucas Bouck**, UNIVERSITY OF MARYLAND  
**Dr. Rebecca Durst, PhD**, Brown University

8:00AM *HDG Discretiation for the Convection Diffusion Equation*  
(100.1) **Lucas Bouck**<sup>\*</sup>, Carnegie Mellon University (1203-65-42853)

8:30AM *Hybridizable discontinuous Galerkin methods for the incompressible miscible displacement problem under minimal regularity*  
(100.2) **Keegan Kirk**<sup>\*</sup>, George Mason University (1203-65-45087)

9:00AM *Convergence analysis of dual-wind discontinuous Galerkin methods for a convection-dominated problem*  
(100.3) **Sijing Liu**<sup>\*</sup>, Worcester Polytechnic Institute, **Yi Zhang**, University of North Carolina at Greensboro, **Thomas Lee Lewis**, University of North Carolina at Greensboro and **Satyajith Bommana Boyana**, Florida Polytechnic University (1203-65-40656)

9:30AM *A mass-conservative, unconditionally stable and bound-preserving finite element method for the quasi-incompressible Cahn-Hilliard-Darcy equations.*  
(100.4) **Sayantan Sarkar**<sup>\*</sup>, State University of New York at Buffalo, **Daozhi Han**, The State University of New York at Buffalo and **Xiaoming Wang**, Department of Mathematics and Statistic, Missouri University of Science and Technology (1203-65-41227)

10:00AM *ON THE CONVERGENCE OF AN IEQ-BASED FIRST-ORDER SEMI-DISCRETE SCHEME FOR THE BERIS-EDWARDS SYSTEM*  
(100.5) **Yukun Yue**<sup>\*</sup>, University of Wisconsin-Madison (1203-65-43981)

10:30AM *A First Order Mesh-free Method for Time-dependent Nonlinear Conservation Laws*  
▶ (100.6) **Samuel Ho-Ching Kwan**<sup>\*</sup>, Rice University and **Jesse Chan**, Rice University (1203-65-44278)

11:00AM *Parameter Scalings and Convergence Analysis of Time Relaxation Reduced Order Model for Fluid Flow*  
◆ (100.7)

**Jorge Reyes**<sup>\*</sup>, Virginia Tech, **Ping-Hsuan Tsai**, Virginia Tech and **Traian Iliescu**, Virginia Tech (1203-65-40457)

11:30AM *Tensor-Train Finite Volume Methods for Accelerated Solving of the Shallow Water Equations*  
▶ (100.8)

**Derek Desantis**<sup>\*</sup>, Los Alamos National Laboratory, **Mustafa Danis**, Los Alamos National Laboratory, **Duc Truong**, Los Alamos National Laboratory, **Mark Petersen**, Los Alamos National Laboratory, **Kim Rasmussen**, Los Alamos National Laboratory and **Boian Alexandrov**, Los Alamos National Laboratory (1203-65-42010)

***(101) AMS Special Session on Advances in Statistical Modeling and Data Analysis, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM Yakima 1, Level 1, Seattle Convention Center Arch at 800 Pike

Organizer: **Shusen Pu**, University of West Florida

8:00AM *Introductory Remarks*

8:30AM *A Marginal Structural Model for Partial Compliance in SMARTs*  
◆ (101.2) **Indrabati Bhattacharya**<sup>\*</sup>, Florida State University, **William J. Artman**, University of Rochester, **Ashkan Ertefaie**, University of Rochester, **Brent Johnson**, University of Rochester, **Kevin G. Lynch**, University of Pennsylvania and **James R. McKay**, University of Pennsylvania (1203-62-40863)

9:00AM *On wavelet-based features for classifying functional data*  
▶ (101.3) **Michael Carnival**<sup>\*</sup>, University of West Florida and **Achraf Cohen**, University of West Florida (1203-68-40216)

9:30AM *Dynamic parametric modelling of large-scale data via change points.*  
▶ (101.4) **Abhishek Kaul**<sup>\*</sup>, Washington State University (1203-62-41735)

10:00AM *Joint Graphical Lasso with Regularized Aggregation*  
(101.5) **Jongik Chung**<sup>\*</sup>, Department of Statistics and Data Science, University of Central Florida, **Qihu Zhang**, Department of Data Science, Fei Tian College - Middletown, **Jennifer E. Mcdowell**, Department of Psychology, University of Georgia and **Cheolwoo Park**, Department of Mathematical Sciences, KAIST (1203-62-38738)

10:30AM *Matrix Decomposition, Approximation and Completion with Automatedly-configured Kronecker Products*  
▶ (101.6) **Chencheng Cai**<sup>\*</sup>, Washington State University (1203-62-39425)

11:00AM *Bayesian Deep Learning on Ridge Penalized Bayesian Exponential Random Graph Models*  
(101.7) **Vicki Modisette**<sup>\*</sup>, Eastern Kentucky University and **Dan Han**, University of Louisville (1203-62-45335)

11:30AM *Bandwidth Selection for Zero Lugsail Estimators*  
 (101.8) **Rebecca Kurtz-Garcia**, Smith College and **James Flegal**, University of California Riverside (1203-62-43559)

**(102) AMS Special Session on Affine Algebraic Geometry and  $G_a$ -Actions, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM 607, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Gene Freudenburg**, Western Michigan University  
**Neena Gupta**, Indian Statistical Institute

8:00AM *Factorial affine varieties with a torus action of complexity one*  
 ► (102.1) **Takanori Nagamine**, Nihon University (1203-14-40272)

9:00AM *Borel Subgroups in Algebraic Transformation Groups*  
 (102.2) **Immanuel van Santen**, University of Basel (1203-14-43300)

10:00AM *Faithfully flat quotient morphisms by free  $G_a$ -actions on smooth factorial affine varieties of dimension  $\leq 4$*   
 (102.3) **Kayo Masuda**, Kwansei Gakuin University (1203-14-40671)

11:00AM *The freeness property for locally nilpotent derivations*  
 (102.4) **M'Hammed El Kahoui**, Cadi Ayyad University (1203-14-42295)

**(103) AMS Special Session on Analysis and Differential Equations at Undergraduate Institutions, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM 304, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Taryn Cristina Flock**, Macalester College  
**Daniel Willem Van Wyk**, Fairfield University

8:00AM *Deterministic and Stochastic Methods for Gene Regulatory Networks: Modeling and Stability Analysis*  
 ► (103.1) **Anil Devarapu**, University of North Georgia and **Zephyrinus C. Okonkwo**, Albany State University (1203-34-45490)

8:30AM *Power Series and ODEs: Obsolete? Or cutting edge?*  
 ► (103.2) **Roger Thelwell**, James Madison University (1203-34-45013)

9:00AM *Doubling measures carried by Lipschitz graphs*  
 ► (103.3) **Lisa Naples**, Fairfield University, Fairfield CT USA (1203-28-39626)

9:30AM *A Bohr-Mollerup Theorem for Interpolating the Triangular Numbers*  
 ► (103.4) **Stephen Abbott**, Middlebury College (1203-26-44253)

10:00AM *A Natural Characterization of Uniform Continuity*  
 ► (103.5) **Jaden A Segovia**, California State University, Fullerton (1203-26-39567)

10:30AM *"A Unified Approach to Differential Equations: Derivatives in the Form of Integrals"*  
 ► ◆ (103.6) **Dongmo Franck Junior**, University of Bamenda Cameroon (1203-34-40520)

11:00AM *Almgren-type monotonicity formulas*  
 ► ◆ (103.7) **Mariana Smit Vega Garcia**, Western Washington University (1203-35-41892)

11:30AM *Stability for the incompressible magnetohydrodynamic (MHD) system*  
 ► (103.8) **Wen Feng**, Sam Houston State University (1203-35-45387)

**(104) AMS Special Session on Bridging Theory and Practice in Ecological Modeling with Reaction Diffusion Equations, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM Skagit 4, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Ratnasingham Shivaji**, University of North Carolina Greensboro  
**Jerome Goddard II**, University of North Carolina at Greensboro

8:00AM *Controlling the spread of invasive species*  
 ► (104.1) **Alan Hastings**, University of California Davis, Santa Fe Institute (1203-92-44772)

9:00AM *Impact of Water Flow on Schistosomiasis Transmission: Insights from a Reaction-Advection-Diffusion Model*  
 ► ◆ (104.2) **Xiunan Wang**, University of Tennessee at Chattanooga (1203-92-41687)

9:30AM *Existence and multiplicity of positive solutions to nonlinear Schrödinger equations on a bridge type unbounded graph*  
 ► (104.3) **Junping Shi**, College of William & Mary and **Jiazheng Zhou**, Universidade de Brasilia (1203-35-40907)

10:00AM *CANCELLED - Effect of Repelling Chemotaxis on Propagation*  
 (104.4) **Olga Turanova**, Michigan State University (1203-35-41215)

10:30AM *The complex dynamics of a diffusive prey-predator model with an Allee effect in prey*  
 (104.5) **Yun Kang**, Arizona State University and **Feng Rao**, Nanjing Tech University, (1203-92-39025)

11:00AM *Modeling the effects of trait-mediated dispersal on coexistence of two species: competition and nonconsumptive predator-prey II*  
 (104.6) **Ananta Acharya**, Eastern New Mexico University, **Jerome Goddard II**, Auburn University at Montgomery, **Amila Muthunayake**, Weber State University, **Dustin Nichols**, High Point University and **Ratnasingham Shivaji**, University of North Carolina at Greensboro (1203-35-42966)

11:30AM *Modeling the Impact of Spatially Heterogeneous Pollution on Personality-Driven Population Dynamics Using a Prey-Taxis Model*  
 ▶ ◆ (104.7)  
**Tianxu Wang**<sup>\*</sup>, University of Alberta, **Jiwoon Sim**, University of Alberta and **Hao Wang**, University of Alberta (1203-35-41566)

***(105) AMS Special Session on Diversity in Mathematical Biology, I***

THURSDAY, JANUARY 09 8:00AM–12:00PM Skagit 5, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Anna C. Nelson**, Duke University  
**Daniel Alejandro Cruz**, University of Florida

8:00AM *Examining Reproductive Health Disparities through a Mathematical Lens*  
 ▶ ◆ (105.1)  
**Erica J. Graham**<sup>\*</sup>, Bryn Mawr College (1203-92-44629)

8:30AM *Modeling infectious disease with changeable attitudes toward vaccination*  
 ▶ (105.2)  
**Kristin Kurianski**<sup>\*</sup>, California State University Fullerton, **Yi Jiang**, Southern Illinois University Edwardsville, **Jane Hyo Jin Lee**, Stonehill College, **Yanping Ma**, Loyola Marymount University, Los Angeles CA USA, **Daniel Cicala**, Southern Connecticut State University and **Glenn Ledder**, University of Nebraska-Lincoln (1203-92-43577)

9:00AM *A topological framework for analyzing access to resources with heterogenous quality*  
 ▶ (105.3)  
**Sarah Tymochko**<sup>\*</sup>, UCLA, **Gillian Grindstaff**, Oxford, **Abigail Hickok**, Yale University, **Jiajie Luo**, UCLA and **Mason A Porter**, UCLA (1203-55-43796)

9:30AM *Synchronization & Robustness of Coupled Complex Networks*  
 ▶ ◆ (105.4)  
**Fatou K Ndow**<sup>\*</sup>, University of Iowa and **Zahra Aminzare**, University of Iowa (1203-92-43846)

10:00AM *Pairwise alignment at arbitrary evolutionary distance*  
 ▶ (105.5)  
**Brandon Jerome Legried**<sup>\*</sup>, Georgia Institute of Technology (1203-92-41749)

10:30AM *Dynamics of Integrated Tick Management through Agent-based Modeling*  
 ▶ (105.6)  
**Holly D Gaff**<sup>\*</sup>, Old Dominion University and **Alexis L White**, University of Rhode Island (1203-92-41222)

11:00AM *Stabilization of Platelet Aggregates in High Shear Rate Flows by Von Willebrand Factor*  
 ▶ (105.7)  
**Keshav B Patel**<sup>\*</sup>, University of Utah, **Jian Du**, Florida Institute of Technology and **Aaron Fogelson**, University of Utah (1203-104-44055)

11:30AM *Emergent flow asymmetries from the metachronal motion of soft flexible paddles*  
 ▶ (105.8)  
**Alexander P Hoover**<sup>\*</sup>, Cleveland State University (1203-76-43811)

***(106) AMS Special Session on Geometric and Combinatorial Methods in Deep Learning Theory, I***

THURSDAY, JANUARY 09 8:00AM–12:00PM 613, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Julia Elisenda Grigsby**, Boston College  
**Rishi Sonthalia**, UCLA  
**Kathryn Anne Lindsey**, Boston College

8:00AM *A primal-dual analysis of the implicit bias of steepest descent methods*  
 (106.1)  
**Matus Telgarsky**<sup>\*</sup>, Courant Institute, NYU (1203-00-45653)

9:00AM *Compositional sparsity in deep learning*  
 ▶ (106.2)  
**Maia Fraser**<sup>\*</sup>, University of Ottawa (1203-68-44163)

9:30AM *Betti numbers of binary and multiclass decision regions of ReLU neural networks*  
 ◆ (106.3)  
**Marissa Masden**<sup>\*</sup>, University of Puget Sound (1203-57-42846)

10:00AM *Improving Convergence and Generalization in Deep Learning Using Parameter Symmetries*  
 ▶ (106.4)  
**Robin Walters**<sup>\*</sup>, Northeastern University (1203-68-45183)

10:30AM *Symmetries in Neural Networks and Why They Matter*  
 ▶ (106.5)  
**Henry Kvinge**<sup>\*</sup>, Pacific Northwest National Laboratory (1203-68-40954)

11:00AM *Bounds for the smallest eigenvalue of the NTK for arbitrary spherical data of arbitrary dimension*  
 ▶ ◆ (106.6)  
**Kedar Karhadkar**, University of California, Los Angeles, **Michael Murray**, University of Bath and **Prof. Guido Francisco Montufar**<sup>\*</sup>, University of California, Los Angeles (1203-68-42420)

***(107) AMS Special Session on Graphs, Hypergraphs, and Extremal Combinatorics, I***

THURSDAY, JANUARY 09 8:00AM–12:00PM Tahoma 4, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Calum Buchanan**, University of Vermont  
**Kimberly P. Hadaway**, Iowa State University  
**Van Magnan**, University of Montana  
**Cory Palmer**, University of Montana

8:00AM *New Methods for Expanders and their Applications*  
 ▶ (107.1)  
**Abhishek Methuku**<sup>\*</sup>, University of Illinois Urbana-Champaign (1203-05-44058)

8:30AM *Codegree conditions for disjoint Berge cycles in  $\mathcal{R}$ -uniform hypergraphs*  
 ◆ (107.2)  
**Michael Santana**<sup>\*</sup>, Grand Valley State University and **Theodore Molla**, University of South Florida (1203-05-43456)

9:00AM *On graphs with chromatic number and maximum degree both equal to nine*  
 (107.3)  
**Jessica McDonald**, Auburn University and **Rachel Galindo**<sup>\*</sup>, Auburn University (1203-05-42523)

- 9:30AM  
▶ (107.4) *Limit points of top eigenvalues of regular graphs*  
**Dingding Dong\***, Harvard University and **Theo McKenzie**, Stanford University (1203-05-41580)
- 10:00AM  
(107.5) *Positroid envelope classes and graphic positroids*  
**Jeremy Quail\***, University of Vermont and **Puck Rombach**, University of Vermont (1203-05-44697)
- 10:30AM  
▶ (107.6) *Minimum graphs with clique covers everywhere*  
**Stacie Baumann\***, College of Charleston and **Joseph Guy Briggs**, Auburn University (1203-05-43719)
- 11:00AM  
▶ (107.7) *Forcing quasirandomness with 4-point permutations*  
**Jae-Baek Lee\***, University of Victoria, **Jonathan A. Noel**, University of Victoria and **Dan Kral**, Masaryk University (1203-05-45440)
- 11:30AM  
▶ (107.8) *Which hypergraphs are vanishing daisies?*  
**Dylan King\***, California Institute of Technology and **David Conlon**, California Institute of Technology (1203-05-41429)

***(108) AMS Special Session on Heegaard Splittings of 3-manifolds and Trisections of 4-manifolds, I***

THURSDAY, JANUARY 09 8:00AM–12:00PM 620, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Alexander Zupan**, University of Nebraska-Lincoln  
**Jeffrey Meier**, Western Washington University  
**Jeffrey Meier**, Western Washington University
- 8:00AM  
▶ (108.1) *Amalgamation of Generalized Heegaard Surfaces and the Strong Haken Theorem*  
**Scott A. Taylor\***, Colby College (1203-57-42296)
- 8:30AM  
(108.2) *The knot meridians of  $(1,1)$ -knot complements are CTF-detected*  
**Qingfeng Lyu\***, Boston College (1203-57-41169)
- 9:00AM  
(108.3) *Noncompact 3-manifolds as branched covers*  
**Mark Hughes**, Brigham Young University, **Alexandra Kjuchukova**, University of Notre Dame and **Maggie Miller\***, University of Texas at Austin (1203-57-41549)
- 9:30AM  
◆ (108.4) *A topological model for the HOMFLY-PT polynomial*  
**Christine Ruey Shan Lee\***, Texas State University and **Cristina Anghel**, University of Leeds (1203-57-40723)
- 10:00AM  
(108.5) *Simple balanced three-manifolds, Heegaard Floer homology and the Andrews-Curtis conjecture*  
**Neda Bagherifard\***, University of Oregon and **Eaman Eftekhary**, School of Mathematics, Institute for Research in Fundamental Sciences (IPM) (1203-57-42446)

- 10:30AM  
(108.6) *Coxeter quotients of knot groups through 16 crossings*  
**Ryan Blair\***, CSU Long Beach, **Alexandra Kjuchukova**, University of Notre Dame and **Nathaniel Morrison**, UC Berkeley (1203-57-42681)
- 11:00AM  
▶ (108.7) *Fibered Knots, Property S, and The Diffeomorphism Type of Certain Link Traces: A Preliminary Report*  
**Trevor Oliveira-Smith\***, UC Davis (1203-57-44300)
- 11:30AM  
▶ ◆ (108.8) *All is rep-tile*  
**Alexandra Kjuchukova\***, University of Notre Dame, **Patricia Cahn**, Smith College, **Ryan Blair**, CSU Long Beach and **Hannah Schwartz**, Princeton University (1203-57-45111)

***(109) AMS Special Session on Homological Interactions Between Commutative and Noncommutative Algebra, I***

THURSDAY, JANUARY 09 8:00AM–12:00PM 602, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Luigi Ferraro**, Texas Tech University  
**Souvik Dey**, Charles University, Prague
- 8:00AM  
(109.1) *Some open questions in noncommutative algebra*  
**James Jian Zhang\***, University of Washington (1203-16-40849)
- 8:30AM  
(109.2) *Formal extensions of noncommutative tensor-triangular support varieties*  
**Merrick Cai**, Harvard University and **Kent B. Vashaw\***, University of California Los Angeles (1203-18-43980)
- 9:00AM  
(109.3) *The Tate Intermediate Value Theorem*  
**Beren Sanders\***, University of California, Santa Cruz (1203-18-43974)
- 9:30AM  
(109.4) *Multiplicities in triangulated categories*  
**David A Jorgensen\***, University of Texas, Arlington, **Petter Bergh**, Norwegian University of Science and Technology and **Peder Thompson**, Malardalens Universitet (1203-16-43164)
- 10:00AM  
(109.5) *Dynkin diagrams and higher Auslander algebras, Cluster Tilting Objects and Preprojective Algebras*  
**Gordana Glisa Todorov\***, Northeastern University (1203-16-45161)
- 10:30AM  
▶ (109.6) *Quadratic Poisson polynomial rings in 4 variables*  
**Eric Zhang\***, University of Washington (1203-17-40500)
- 11:00AM  
(109.7) *Loewy lengths of modules of finite projective dimension*  
**Josh Pollitz\***, Syracuse University and **KC Nawaj**, University of Nebraska-Lincoln (1203-13-43792)

11:30AM (109.8) *CANCELLED - Resolutions for triangular Ore extensions*  
**Isaac Bancroft**<sup>\*</sup>, University of North Texas (1203-16-42425)

***(110) AMS Special Session on Machine Learning to Accelerate Mathematical Discovery, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM Skagit 2, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Henry Kvinge**, Pacific Northwest National Laboratory  
**Herman Chau**, University of Washington  
**Davis Richard Brown**, Pacific Northwest National Laboratory  
**Sara C. Billey**, University of Washington  
**Helen Jenne**, Pacific Northwest National Laboratory

8:00AM (110.1) *CANCELLED Generation of Calabi-Yau Manifolds via Machine Learning*  
**Edward Hirst**<sup>\*</sup>, Queen Mary, University of London (1203-51-38219)

8:30AM (110.2) *Grassmannian cluster algebras and machine learning*  
**Man-Wai Cheung**, Kavli IPMU, **Pierre-Philippe Dechant**, University of Leeds, **Yang-Hui He**, London Institute for Mathematical Sciences, **Elli Heyes**, City, University of London, **Edward Hirst**, Queen Mary, University of London and **Jianrong Li**<sup>\*</sup>, Universität Wien, Vienna, Austria (1203-05-40267)

9:00AM (110.3) *Machine Learning new relations and identities on polyhedral properties*  
▶ ◆  
**Jesus A. De Loera**<sup>\*</sup>, Dept. of Mathematics, Univ. California (1203-05-45731)

9:30AM (110.4) *Scale-consistent learning with neural operators*  
**Zongyi Li**<sup>\*</sup>, Caltech, **Samuel Lanthaler**, California Institute of Technology, **Catherine Deng**, Caltech, **Yixuan Wang**, Caltech, **Kamyar Azzizadeneshili**, Nvidia and **Anima Anandkumar**, Caltech (1203-68-43636)

10:00AM *Break*

10:30AM (110.6) *Understanding LLM Generalization with a Computational Lens*  
▶  
**Preetum Nakkiran**<sup>\*</sup>, Apple (1203-68-45745)

11:00AM (110.7) *Advancing Mathematical Reasoning and Discovery with Language Models*  
▶ ◆  
**Pan Lu**<sup>\*</sup>, Stanford University (1203-68-42970)

11:30AM (110.8) *Report on a Program on Mathematics and Machine Learning at the Center of Mathematical Sciences and Applications*  
**Michael R. Douglas**<sup>\*</sup>, Harvard / Stony Brook (1203-103-42242)

***(111) AMS Special Session on Mathematics, AI, and the Social Context of Our Work, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM 618, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Darren Byler**, Simon Fraser University  
**Yaim Cooper**, University of Notre Dame

8:00AM (111.1) *Impact of machine learning on the experience of a researcher*  
▶  
**Fabian Ruehle**<sup>\*</sup>, Northeastern University (1203-104-45583)

8:30AM (111.2) *Mechanization of mathematics: who decides*  
▶  
**Michael Harris**<sup>\*</sup>, Columbia University (1203-104-45556)

9:00AM (111.3) *New Economies of Proof in the Early Automation of Mathematics*  
▶  
**Stephanie Dick**<sup>\*</sup>, Simon Fraser University (1203-104-44694)

9:30AM *Panel and Discussion*

10:00AM (111.5) *How AI may change economics and norms in professional mathematics*  
▶  
**Yaim Cooper**<sup>\*</sup>, simon fraser (1203-104-45588)

10:30AM (111.6) *Building Capacity to Teach and Assess Ethics in Mathematics*  
**Victor Piercey**<sup>\*</sup>, Ferris State University and **Rochelle Elaine Tractenberg**, Georgetown University (1203-101-45167)

11:00AM (111.7) *Ways that AI can contribute to climate change*  
▶  
**David Rolnick**<sup>\*</sup>, McGill University (1203-104-45578)

11:30AM *Panel and Discussion*

***(112) AMS Special Session on Modular Forms, Hypergeometric Functions, and Related Topics, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM 604, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Michael Allen**, Oregon State University  
**Kalani Thalagoda**, Tulane University  
**Holly Swisher**, Oregon State University  
**Fang-Ting Tu**, Louisiana State University

8:00AM (112.1) *Densities of bounded primes for hypergeometric series*  
**Cameron Franc**<sup>\*</sup>, McMaster University (1203-11-43364)

8:30AM (112.2) *Hypergeometric functions and modular forms*  
**Mohit Tripathi**<sup>\*</sup>, Texas Tech University, Lubbock. (1203-11-43977)

9:00AM (112.3) *L-functions of hypergeometric motives*  
**David L Roe**<sup>\*</sup>, Massachusetts Institute of Technology, **Kiran S Kedlaya**, University of California San Diego and **Edgar Costa**, MIT (1203-33-43253)

9:30AM (112.4) *Hypergeometric Distributions Arising from Joint Families of Elliptic Curves*  
**Hasan Saad**<sup>\*</sup>, Louisiana State University and **Brian Grove**, Louisiana State University (1203-11-41789)

11:00AM *Density of mod-2-dihedral powers of the Dedekind eta function*  
 ▶ (112.5)  
**Steven Charlton**, Max Planck Institute for Mathematics, **Lukas Mauth**, University of Cologne and **Anna Medvedovsky**, University of Arizona (1203-11-44706)

10:30AM *Explicit formulas for the Shimura Correspondence*  
 (112.6)  
**Ms. Swati**, University of South Carolina and **Matthew Boylan**, University of South Carolina (1203-11-42244)

11:00AM *A modular framework of functions of Knopp*  
 (112.7)  
**Kathrin Bringmann**, University of Cologne and **Andreas Mono**, Vanderbilt University (1203-11-37520)

11:30AM *Special values of Hecke  $L$ -series for  $S_n$  modules*  
 (112.8)  
**Erik Davis**, Texas A&M University and **Matthew Papanikolas**, Texas A&M University (1203-11-44128)

**(113) AMS Special Session on New Faces in Operator Theory, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM 201, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Michael R Pilla**, Florida Polytechnic University  
**William Thomas Ross**, University of Richmond

8:00AM *Frames Generated by Unilateral Iterations of Bounded Commuting Operators*  
 (113.1)  
**Victor Bailey**, University of Oklahoma (1203-46-40729)

8:30AM *Hermitian projections on Operator Spaces : Something old, something new, something borrowed, something blue*  
 ▶ (113.2)  
**Priyadarshi Dey**, Kenyon College (1203-47-42752)

9:00AM *Pseudo-Riesz bases and their expansion properties*  
 ◆ (113.3)  
**Deborpita Biswas**, Clemson University (1203-47-44384)

9:30AM *Square Roots of Weighted Shifts of Multiplicity Two*  
 ▶ ◆ (113.4)  
**Chanaka Kottegoda**, Marshall University, **Trieu Le**, The University of Toledo and **Tomas Miguel P Rodriguez**, Kenyon College (1203-47-42264)

10:00AM *Resolvent growth estimates and the similarity problem*  
 (113.5)  
**Georgios Tsikalas**, Vanderbilt University (1203-47-42504)

10:30AM *Quantum harmonic analysis on spaces of analytic functions*  
 ◆ (113.6)  
**Vishwa Dewage**, Clemson University, **Matthew Dawson**, CIMAT, Merida, Mexico, **Mishko Mitkovski**, Clemson University and **Gestur Olafsson**, Louisiana State University (1203-47-40759)

11:00AM *Joint conditions for boundedness of dyadic paraproducts*  
 ▶ ◆ (113.7)  
**Ana Colovic**, Washington University in St. Louis (1203-42-43033)

11:30AM *A Note on the Stabilizer Formalism via Noncommutative Graphs*  
 ▶ (113.8)  
**Roy Araiza**, University of Illinois at Urbana-Champaign (1203-46-42860)

**(114) AMS Special Session on Non-smooth Analysis and Geometry, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM 210, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Guy C. David**, Ball State University  
**Vyron Vellis**, University of Tennessee, Knoxville

8:00AM *Polarizable Carnot groups and the  $H$ -type deviation of step two Carnot groups*  
 (114.1)  
**Jeremy T. Tyson**, University of Illinois at Urbana Champaign (1203-53-41971)

8:30AM *Quasiregular cobordism theorem*  
 (114.2)  
**Pekka Pankka**, University of Helsinki and **Jang-Mei Wu**, University of Illinois, Urbana-Champaign (1203-30-41693)

9:00AM *Conformal dimension of the Brownian graph*  
 (114.3)  
**Hrant Hakobyan**, Kansas State University (1203-30-44709)

9:30AM *Geometric Rectifiability and Co-Uniformity in Metric Measure Spaces*  
 (114.4)  
**Jacob Gregory Honeycutt**, University of Tennessee, Knoxville, **Vyron Vellis**, University of Tennessee and **Scott Zimmerman**, The Ohio State University At Marion (1203-30-41135)

10:00AM *Infinitesimal Spaces of Quasiregular Mappings*  
 (114.5)  
**Alastair N Fletcher**, Northern Illinois University (1203-30-42576)

10:30AM *A tour of  $\mathcal{P}_n(0)$  curves*  
 ◆ (114.6)  
**Caroline Davis**, Indiana University Bloomington (1203-37-40814)

11:00AM *Large-scale properties of inhomogeneous Newton-Sobolev spaces of functions on nonsmooth spaces of locally controlled geometry*  
 (114.7)  
**Nageswari Shanmugalingam**, University of Cincinnati, **Ilmari Kangasniemi**, University of Cincinnati and **Ryan Gibara**, University of Cincinnati (1203-31-43753)

11:30AM *Geometry and the Rellich-Kondrachov embedding theorem*  
 ◆ (114.8)  
**Ryan Alvarado**, Amherst College (1203-30-44983)

**(115) AMS Special Session on Recent Advancement in Control Theory and Applications in Artificial Intelligence, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM 205, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Bonny Banerjee**, University of Memphis  
**Shalmali Bandyopadhyay**, University of Tennessee at Martin

8:00AM (115.1) *Occasionally Observed Piecewise-deterministic Markov Processes*  
**Marissa Ann Gee**, Kenyon College and  
**Alexander Vladimirovsky**, Cornell University (1203-49-42154)

9:00AM (115.2) *Fluid-Plate Interaction systems with square-root damping: an investigation of analyticity and stability and applications to stabilization with boundary controls*  
**Rasika Mahawattege**, University of Maryland Baltimore County and **Xiang Wan**, Loyola University Chicago (1203-35-43227)

10:00AM (115.3) *Observability of the heat equation from very small sets*  
**Andrew Walton Green**, Washington University In St. Louis, **Kévin Le Bal'h**, INRIA, Sorbonne Université, Université de Paris, CNRS, Laboratoire Jacques-Louis Lions, **Jérémy Martin**, INRIA, Sorbonne Université, Université de Paris, CNRS, Laboratoire Jacques-Louis Lions and **Marcu-Antone Orsoni**, University of Toronto Mississauga (1203-35-43342)

11:00AM (115.4) *Controllability of a Cochlea*  
**Scott Hansen**, Iowa State University (1203-93-44221)

**(116) AMS Special Session on Recent Advancements in Integrable Systems and Orthogonal Polynomials, I**

THURSDAY, JANUARY 09 8:00AM-12:00PM 303, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Tom Trogdon**, University of Washington  
**Deniz Bilman**, University of Cincinnati  
**Cade Ballew**, University of Washington

8:00AM (116.1) *Asymptotic analysis of Riemann-Hilbert and D-bar problems, and applications to the asymptotic behavior of integrable nonlinear partial differential equations*  
**Kenneth McLaughlin**, Tulane University (1203-35-45188)

8:30AM (116.2) *Talanov Self-focusing in the focusing NLS hierarchy*  
**Bob Jenkins**, University of Central Florida, **Robert J Buckingham**, University of Cincinnati and **Peter D. Miller**, University of Michigan (1203-35-44321)

9:00AM (116.3) *Strong zero dispersion asymptotics for the Benjamin-Ono equation with rational initial data*  
**Elliot Blackstone**, University of Michigan (1203-35-39428)

9:30AM (116.4) *Universality in the Small-Dispersion Limit of the Benjamin-Ono Equation*  
**Peter D. Miller**, University of Michigan (1203-35-41342)

10:00AM (116.5) *Breather gas fission from elliptic potentials in focusing media*  
**Gino Biondini**, SUNY Buffalo (1203-35-43334)

10:30AM (116.6) *Spectral validation of the Whitham modulation equations for the Camassa-Holm equation*  
**Jeffrey Oregero**, University of Kansas and **Mathew A. Johnson**, University of Kansas (1203-35-43250)

11:00AM (116.7) *A numerical Riemann-Hilbert approach to the computation of transform pairs*  
**Kaitlynn Nichole Lilly**, University of Washington and **Tom Trogdon**, University of Washington (1203-35-39522)

11:30AM (116.8) *Numerical inverse scattering transform for the defocusing nonlinear Schrodinger equation with non-zero boundary conditions and box-type initial conditions*  
**Katerina Gkogkou**, Tulane University (1203-35-44348)

**(117) AMS Special Session on Research Results by Mathematicians from the Enhancing Diversity in Graduate Education (EDGE) Program, I**

THURSDAY, JANUARY 09 8:00AM-12:00PM Skagit 3, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Sofia Rose Martinez Alberga**, Purdue University

**Kelly Buch**, University of Tennessee Knoxville  
**Alexis Hardesty**, Texas Woman's University  
**Quiyana M. Murphy**, Virginia Tech

8:00AM (117.1) *Recent Developments in Equivariant Morse Homology*  
**Lina Liu**, University of Minnesota (1203-55-41904)

8:30AM (117.2) *A Discussion of Tools for Computationally Expensive Models*  
**Alejandra Castillo**, Oregon State University (1203-62-45630)

9:00AM (117.3) *Backward Euler-Forward Euler Partitioned Schemes for FPSI Problems*  
**Connor Parrow**, University of Notre Dame and **Martina Bukac**, University of Notre Dame (1203-65-41146)

9:30AM (117.4) *Transmission of La Crosse Virus between Humans and Mosquitoes in Tennessee and North Carolina*  
**Amber Young**, University of Tennessee, Knoxville (1203-92-42363)

10:00AM (117.5) *Multiscale coupling of Biot's equations and blood flow ODE*  
**Sarah Strikwerda**, University of Wisconsin - Madison (1203-35-43613)

10:30AM (117.6) *Exploring the Impact of Network Symmetry on Power Grid Stability: A Graph-Theoretic Approach*  
**Tayler Fernandes Nunez**, Cornell University, **Shriya Nagpal**, Pitzer College and **Lindsay Anderson**, Cornell University (1203-37-44547)

11:00AM *Parkordle \$=\$ Parking \$+\$ Wordle: Counting Lucky Spots and Lucky Cars in Parking Functions*  
 ▶ ◆ (117.7)  
**Kimberly P. Hadaway**<sup>\*</sup>, Iowa State University, **Steve Butler**, Iowa State University, **Victoria Lenius**, Iowa State University, **Preston Martens**, Iowa State University and **Marshall Moats**, Iowa State University (1203-05-44090)

11:30AM *EDGE Networking Session*  
 ▶ ◆ (117.8)  
**Alexis Hardesty**<sup>\*</sup>, Texas Woman's University, **Kelly Buch**, Austin Peay State University, **Sofia Rose Martinez Alberga**, Purdue University and **Quiyana M. Murphy**, Virginia Tech (1203-104-40951)

**(118) AMS Special Session on Solutions of Probability or Applied Random Process Problems Using Linear Algebraic or Combinatorial Methods, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM Yakima 2, Level 1, Seattle Convention Center Arch at 800 Pike

Organizers: **Randall J. Swift**, California State Polytechnic University, Pomona  
**Alan Krinik**, California State Polytechnic University, Pomona

8:00AM *Continuum polymer measures corresponding to the critical 2d stochastic heat flow*  
 (118.1)  
**Barkat Mian**<sup>\*</sup>, The University of Mississippi (1203-60-41141)

8:30AM *Closed-Form Expressions for Cumulative Probability of Bivariate and Trivariate Normal Distributions over Angular Regions*  
 ▶ (118.2)  
**Sean Kanne**<sup>\*</sup>, California State Polytechnic University, Pomona, **Alan Krinik**, California State Polytechnic University, Pomona and **Corey M Bangi**, California State Polytechnic University, Pomona (1203-60-43238)

9:00AM *Visualizing Generalized Steady-State Distributions for Low Dimensional, Somewhat Stochastic Birth-Death Matrices*  
 ▶ ◆ (118.3)  
**Sergio Valentin Navia**<sup>\*</sup>, California State Polytechnic University, Pomona, **Sean Kanne**, California State Polytechnic University, Pomona, **Heba Ayeda**, California State Polytechnic University, Pomona, **Corey M Bangi**, California State Polytechnic University, Pomona and **David Beecher**, California State Polytechnic University, Pomona (1203-60-43091)

9:30AM *On fractional hyperbolic diffusion random field*  
 (118.4)  
**A. Ya Olenko**<sup>\*</sup>, La Trobe University, Australia, **Phil Broadbridge**, La Trobe University, Australia, **Illia Donhauzer**, La Trobe University, Australia and **Nikolai Leonenko**, Cardiff University, UK (1203-35-42778)

10:00AM *Sharpened Localization of the Trailing Point of the Pareto Record Frontier*  
 (118.5)  
**James Allen Fill**<sup>\*</sup>, The Johns Hopkins University, Department of Applied Mathematics and Statistics, **Daniel Q. Naiman**, The Johns

Hopkins University, Department of Applied Mathematics and Statistics and **Ao Sun**, The Johns Hopkins University, Department of Applied Mathematics and Statistics (1203-60-42454)

10:30AM *Towards a Proof of the McCarty Conjecture*  
 ▶ (118.6)  
**Anant P. Godbole**, East Tennessee State University, **Lybitina Koene**, Virginia Tech and **Grant Shirley**<sup>\*</sup>, East Tennessee State University (1203-60-41182)

11:00AM *Variance reduction in Texas hold'em and in video poker*  
 ▶ (118.7)  
**Stewart Ethier**<sup>\*</sup>, University of Utah (1203-60-42003)

11:30AM *First Ahead by at least k Multinomial Game*  
 ▶ (118.8)  
**Sheldon M Ross**<sup>\*</sup>, University of Southern California (1203-60-43108)

**(119) AMS Special Session on Spectral Theory and Mathematical Physics, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM 203, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Christoph Fischbacher**, University of California, Irvine  
**Jonathan Stanfill**, Baylor University

8:00AM *Fourier quasicrystals from stable polynomials and beyond*  
 (119.1)  
**Lior Alon**, MIT, **Mario Kummer**, TU Dresden, **Pavel B Kurasov**, Stockholm Univ and **Cynthia L Vinzant**<sup>\*</sup>, University of Washington, Seattle (1203-42-44719)

9:00AM *On Lieb-Thirring inequalities and the landscape function*  
 (119.2)  
**Sven Bachmann**<sup>\*</sup>, The University of British Columbia (1203-47-39920)

9:30AM *A Bessel Analogue of the Riesz Composition Formula*  
 (119.3)  
**Roger Nichols**<sup>\*</sup>, University of Tennessee at Chattanooga (1203-47-42956)

10:00AM *Spectral theory for ODEs with distributional coefficients*  
 (119.4)  
**Rudi Weikard**<sup>\*</sup>, University of Alabama at Birmingham (1203-47-42637)

11:00AM *Dispersive estimate for Schrödinger equation with Coulomb potential*  
 ◆ (119.5)  
**Ebru Toprak**<sup>\*</sup>, Yale University, **Adam Black**, Yale University, **Bruno Vergara**, Brown University and **Jiahua Zou**, Rutgers University (1203-35-42702)

11:30AM *Ionization asymptotics of a model atom perturbed by a time-periodic zero-range potential.*  
 ◆ (119.6)  
**Gabriel A Coloma Irizarry**<sup>\*</sup>, The Ohio State University, Columbus (1203-47-44669)

**(120) AMS Special Session on Spectral Theory of Ergodic Operators and Related Models, II**

THURSDAY, JANUARY 09 8:00AM–12:00PM 608, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Svetlana Jitomirskaya**, University of  
California, Berkeley

**Netanel Levi**, UC Irvine

**Matthew Powell**, Georgia Institute of  
Technology

**Matthew Powell**, Georgia Institute of  
Technology

8:00AM *Absence of Point Spectrum in Long Range*  
◆ (120.1) *Operators over Circle Homeomorphisms*  
**Jiranan Kerdboon**<sup>\*</sup>, University of California,  
Irvine (1203-37-45178)

8:30AM  *$\alpha$ -Subordinacy Theory of Jacobi*  
(120.2) *Operators on  $\ell^2(\mathbb{Z})$*   
**Netanel Levi**<sup>\*</sup>, Hebrew University of Jerusalem  
and **Yoram Last**, Hebrew University of  
Jerusalem, Israel (1203-81-43124)

9:00AM *Bulk-edge correspondence for topological*  
► ◆ *insulators with curved interface*  
(120.3) **Xiaowen Zhu**<sup>\*</sup>, University of Washington and  
**Alexis Drouot**, University of Washington  
(1203-81-42023)

9:30AM *Break*

10:00AM *Spectral localization in the random XXZ spin*  
(120.5) *chain*  
**Abel Klein**<sup>\*</sup>, University of California Irvine and  
**Alexander Elgart**, Virginia Tech (1203-82-  
43513)

10:30AM *Almost periodicity in time of the solutions to*  
(120.6) *cubic defocusing nonlinear Schrödinger*  
*equations*  
**Long Li**<sup>\*</sup>, Rice University (1203-47-43183)

11:00AM *Discrepancy estimates and quantum dynamics*  
► (120.7) **Wencai Liu**, Texas A&M University, **Matthew**  
**Powell**, Georgia Institute of Technology and  
**Xueyin Wang**<sup>\*</sup>, Texas A&M University (1203-  
37-41775)

11:30AM *Spectral theory of the Schrodinger type*  
(120.8) *operators on the periodic quantum graphs*  
**Stanislav A Molchanov**<sup>\*</sup>, University of North  
Carolina at Charlotte (1203-81-39098)

**(121) AMS Special Session on Systemic Change  
Within and Between K-12 and Post-Secondary  
Mathematics Education: Improvement for Smooth  
Transitions and Increased Persistence in  
Mathematics for All Students, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM Chelan 2, Level 2,  
Seattle Convention Center Arch at  
800 Pike

Organizers: **Josh Recio**, Charles A. Dana Center, The  
University of Texas at Austin

**Katherine Leigh Arrington**, Charles A. Dana  
Center, The University of Texas at Austin

8:00AM *Mathematics Pathways from High School*  
► (121.1) *Through Postsecondary: Successes, challenges,*  
*and future directions*

**David T Kung**<sup>\*</sup>, Director of Programs, TPSE-  
Math, University of Maryland - College Park,  
Founder, Dave Kung Consulting and **Ted Coe**,  
Coequal Math (1203-97-42838)

9:00AM *A Systems Change Approach in Mathematics*  
► (121.2) *Pathways: Changing the K-12 and Higher*  
*Education Systems to Remove Barriers to*  
*Student Success*

**Katherine Leigh Arrington**<sup>\*</sup>, Charles A. Dana  
Center, The University of Texas at Austin  
(1203-97-44472)

10:00AM *Breaking Barriers to Students' Success in*  
► (121.3) *College Calculus*  
**Melodie Baker**<sup>\*</sup>, Just Equations and **Michael**  
**Anthony Tallman**, Oklahoma State University  
(1203-97-43522)

11:00AM *Unlocking Potential: Empowering Students*  
► (121.4) *Through Diverse Math Pathways*  
**Rachel Levy**<sup>\*</sup>, Data Science Academy, North  
Carolina State University, **Anna Bargagliotti**,  
Loyola Marymount University and **Gregory D**  
**Foley**, Ohio University (1203-101-41713)

**(122) AMS Special Session on the Open  
Neighborhood of Applied Topology, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM 614, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Henry Hugh Adams**, Colorado State University  
**Evgeniya Lagoda**, Freie Universität Berlin

8:00AM *Uncrossing posets and the topological*  
(122.1) *combinatorics of stratified spaces of electrical*  
*networks*  
**Patricia L. Hersh**<sup>\*</sup>, University of Oregon (1203-  
05-42029)

8:30AM *Surfaces in the  $d$ -Cube*  
► (122.2) **Dejan Govc**<sup>\*</sup>, University of Ljubljana, Faculty of  
Mathematics and Physics (1203-52-41721)

9:00AM *Topological Methods for Pattern Morphology of*  
► (122.3) *Vegetation in Drylands Ecosystems*  
**Rachel A. Neville**<sup>\*</sup>, Northern Arizona University  
(1203-55-43960)

9:30AM *Topology and zeros of real-valued maps*  
► (122.4) **Florian Frick**<sup>\*</sup>, Carnegie Mellon University  
(1203-55-41747)

10:00AM *On Tverberg-type and Mass Partition problems*  
► (122.5) *via Equivariant Topology*  
**Nikola Sadovek**<sup>\*</sup>, Freie Universität Berlin,  
**Pablo Soberón**, Baruch College, City University  
of New York and **Pavle Blagojević**, Freie  
Universität Berlin, Mathematical Institute SANU,  
Belgrade (1203-52-41591)

10:30AM *Product Tverberg Theorems*  
► ◆ (122.6) **Andreas Holmsen**, KAIST, **Grace McCourt**,  
University of Illinois at Urbana-Champaign,  
**Daniel A McGinnis**, Princeton University and

**Shira Zerbib**<sup>\*</sup>, Iowa State University (1203-52-41907)

11:00AM *A topological analysis of the BBC Loneliness Experiment.*  
▶ (122.7)

**Alexandre Karassev**<sup>\*</sup>, Nipissing University,  
**Mary Pat Sullivan**, Nipissing University, **Bright Effah**, Ontario Northland and **Christina Viktor**, Brunel University (1203-91-41900)

11:30AM *New Method for Analyzing The Hole-Structure of a Crystal: Merge Trees of Periodic Filtrations*  
▶ ◆ (122.8)  
**Teresa Heiss**<sup>\*</sup>, Institute of Science and Technology Austria and **Herbert Edelsbrunner**, Institute of Science and Technology Austria (1203-55-41660)

**(123) AMS Special Session on The Teaching and Learning of Undergraduate Ordinary Differential Equations, I**

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THURSDAY, JANUARY 09 8:00AM–12:00PM Chelan 4, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Viktoria Savatorova**, Central Connecticut State University  
**Beverly H West**, Cornell University  
**Maila B. Hallare**, US Air Force Academy, USAFA CO USA  
**Itai Seggev**, Wolfram Research  
**Johannah L Crandall**, University of Michigan

8:00AM *Effective Online Homework Problems and Student Video Presentations: Supporting Student Success in Online Differential Equations*  
▶ (123.1)  
**Paul E. Seeburger**<sup>\*</sup>, Monroe Community College (1203-101-45413)

8:30AM *Gene Regulation Models: A Pathway to Expanding ODE Teaching in Undergraduate Math*  
▶ ◆ (123.2)  
**Maila B. Hallare**<sup>\*</sup>, US Air Force Academy, USAFA CO USA (1203-101-45649)

9:00AM *Neural Differential Equations in an Undergrade ODE Class*  
▶ (123.3)  
**Nathan Albin**, Kansas State University,  
**Andrew G Bennett**<sup>\*</sup>, Kansas State University and **Abhinav Chand**, Kansas State University (1203-34-42302)

9:30AM *Using a Sand Tank Groundwater Model to Investigate a Groundwater Flow Model*  
▶ (123.4)  
**Michael A. Karls**<sup>\*</sup>, Ball State University (1203-34-42114)

10:00AM *{it Slopes}: A Free, Intuitive Mobile App to Facilitate Exploration of Differential Equations*  
▶ (123.5)  
**Timothy Lucas**<sup>\*</sup>, Pepperdine University (1203-34-43048)

10:30AM *Differential Equations is More Than a Calculus Refinement Course*  
▶ ◆ (123.6)  
**Cesar Martinez-Garza**<sup>\*</sup>, Penn State Berks (1203-101-45805)

11:00AM *Euler's Method by Hand, App, and Spreadsheet (and Graphically)*  
▶ (123.7)

**Douglas B Meade**<sup>\*</sup>, University of South Carolina (1203-101-45416)

11:30AM *Exploring Equilibria and Stability with Mathematica*  
▶ (123.8)

**Itai Seggev**<sup>\*</sup>, Wolfram Research (1203-101-39249)

**(124) AMS Special Session on Topological and Algebraic Properties of Additive Manufacturing, I**

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THURSDAY, JANUARY 09 8:00AM–12:00PM 617, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Bala Krishnamoorthy**, WSU  
**Justin Curry**, University at Albany SUNY  
**Gregory Dreifus**, GE Vernova

8:00AM *A Review of Topological and Algebraic Properties of Additive Manufacturing*  
(124.1)  
**Gregory Dreifus**<sup>\*</sup>, GE Vernova (1203-54-43677)

8:30AM *Circles in the plane -- a soft connection to high-dimensional topology*  
(124.2)  
**Ryan D. Budney**<sup>\*</sup>, University of Victoria, Department of Mathematics and Statistics (1203-57-41195)

9:00AM *Counting arrangements of circles*  
▶ (124.3)  
**Jon Wild**<sup>\*</sup>, McGill University (1203-102-43179)

10:00AM *A mathematician makes, naive tools for machine control*  
▶ (124.4)  
**Edmund O. Harriss**<sup>\*</sup>, University of Arkansas (1203-53-40575)

11:00AM *Optimal Multi-path Planning -- From Topology to Geometry*  
▶ (124.5)  
**Subhrajit Bhattacharya**<sup>\*</sup>, Lehigh University (1203-55-44482)

**(125) AMS Special Session on Trends in Coding Theory, I**

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THURSDAY, JANUARY 09 8:00AM–12:00PM 605, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Alberto Ravagnani**, Eindhoven University of Technology  
**Giuseppe Cotardo**, Virginia Tech

8:00AM *Revisiting block codes.*  
▶ (125.1)  
**Muriel Medard**<sup>\*</sup>, MIT and **Ken R. Duffy**, Hamilton Institute, Maynooth University (1203-94-44899)

8:30AM *Weighted-Hamming Metric for Parallel Channels: Codes and Bounds*  
▶ (125.2)  
**Sebastian Benedikt Bitzer**<sup>\*</sup>, Technical University of Munich, **Alberto Ravagnani**, Eindhoven University of Technology and **Violetta Weger**, Technical University of Munich (1203-94-42108)

9:00AM *A novel Generalization of the MacWilliams Identity*  
▶ (125.3)  
**Violetta Weger**<sup>\*</sup>, Technical University of Munich (1203-94-40879)

- 9:30AM  
▶ (125.4) *Full weight spectrum cyclic subspace codes*  
**Chiara Castello**, Università degli Studi della Campania Luigi Vanvitelli, **Olga Polverino**, Università degli Studi della Campania Luigi Vanvitelli and **Ferdinando Zullo**, University of Campania "Luigi Vanvitelli" (1203-94-41754)
- 10:00AM  
(125.5) *The connectivity of  $q$ -matroids and rank metric codes*  
**Fabrizio Conca**, Eindhoven University of Technology (1203-94-43494)
- 10:30AM  
(125.6) *The free product of  $q$ -matroids*  
**Andrew Fulcher**, University College Dublin, **Eimear Byrne**, University College Dublin and **Gianira Alfarano**, University College Dublin (1203-06-42155)
- 11:00AM  
▶ (125.7) *The random variables of DNA data storage*  
**Stefano Lia**, University College Dublin (1203-94-44376)
- 11:30AM  
▶ (125.8) *Codes for Random Access Efficiency in DNA Storage*  
**Anina Gruica**, Technical University of Denmark (1203-94-41853)

**(126) AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM Skagit 1, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Mark Daniel Ward**, Purdue University  
**Patricia Cahn**, Smith College  
**Khang Duc Tran**, California State University Fresno  
**Darren A. Narayan**, Claremont McKenna College

- 8:00AM  
▶ ◆ (126.1) *Properties and Comparisons of Various Graphs and Their Codes*  
**Elisaveta Vera Samoylov**, Dartmouth College, **Layla Jarrah**, Hamilton College and **Andreas Vincent Garcia**, University of Arizona (1203-05-44165)
- 8:30AM  
▶ (126.2)  *$H$ -older Estimates for the Hausdorff Distance and a Quasi-Metric*  
**Ayooluwanitemi Aitokhuehi**, Rice University, **Benjamin Braiman**, University of Wisconsin - Madison, **David Owen Horace Cutler**, Tufts University, **Robert Deaton**, Georgia Institute of Technology, **Jude Horsley**, University of Utah, **Jen Tang**, University of Chicago, **Prakhar Gupta**, University of Maryland, **Vasanth Pidaparthi**, University of Maryland and **Tamas Darvas**, University of Maryland (1203-52-42612)
- 9:00AM  
▶ (126.3) *Investigating spiral knots*  
**Sarah Blackwell**, University of Virginia, **Ashish Das**, North Carolina State University, **Sydney Mayer**, Washington University in St. Louis, **Luke Moyar**, University of Virginia, **Faisal Quraishi**, University of Nevada, Reno and **Ryan Stees**, University of Virginia (1203-57-39967)

- 9:30AM  
▶ (126.4) *Improving Auditory EEG Decoding with Time-Frequency Analysis using a Shallow Neural Network*  
**Alexander Kei Karbowski**, Harvard University, **Sophia Xiao**, Emory University, **Dylan Marchlinski**, University of Pennsylvania and **Corinne Orton**, University of Utah (1203-68-44808)
- 10:00AM  
▶ (126.5) *The Stamp Folding Problem From a Mountain-Valley Perspective: Enumerations and Bounds*  
**Jacob Paltrowitz**, Harvard University, **Adham Ibrahim**, Princeton University and **Grace Wang**, Carnegie Mellon University (1203-05-38275)
- 10:30AM  
▶ (126.6) *Building a Ground-Up Theory of Permutations*  
**Emilia J Germain**, Frostburg State University, **Neely Lovvorn**, University of North Alabama, **Andres Castellanos**, Sonoma State University, **Kenny Banks**, University of North Carolina, Greensboro and **Thomas Madsen**, Youngstown State University (1203-03-45260)
- 11:00AM  
▶ (126.7) *Counting curves on surfaces*  
**Edwin Lu**, Brown University, **Feng Luo**, Rutgers University, **Hongbin Sun**, Rutgers University New Brunswick and **Shiv Yajnik**, Columbia University (1203-57-43117)

**(127) AWM Special Session on Exploring Mathematics through the Arts and Pedagogy in Creative Settings, I**

THURSDAY, JANUARY 09 8:00AM–12:00PM 619, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Claudia Maria Schmidt**, California State University  
**Shanna Dobson**, California State University, Los Angeles

- 8:00AM  
▶ (127.1) *Deconstructing Diamonds*  
**Claudia Maria Schmidt**, California State University and **Shanna Dobson**, University of California, Riverside (1203-18-41012)
- 8:30AM  
▶ (127.2) *Mathematics Meets Arts - Calculus Projects from Beautiful Architectures*  
**Aihua Li**, Montclair State University (1203-101-43146)
- 9:00AM  
▶ ◆ (127.3) *Math at the Met: field trips and art prizes to engage diverse student populations*  
**Renee Bell**, Lehman College, **Mathilda Asemota**, Lehman College, **Jasmine De Moya**, Lehman College and **Shirley Paulino**, Lehman College (1203-101-41632)
- 10:00AM  
▶ (127.4) *Enhanced Understanding of Mathematics Through Poetry*  
**E. R. Lutken**, Independent (1203-101-41185)
- 11:00AM  
▶ (127.5) *Negation as a foundation and as an open question: how deep conceptual analysis can lead to mathematical innovation in the classroom*

**Sonia de Jager**<sup>\*</sup>, Erasmus University, Rotterdam, Willem de Kooning Fine Arts Academy, Rotterdam (1203-03-39367)

11:30AM  
(127.6) *Descent Conditions on Phantasia*  
**Shanna Dobson**<sup>\*</sup>, University of California, Riverside (1203-18-40839)

**(128) AWM Special Session on Women in Mathematical Biology, III**

THURSDAY, JANUARY 09 8:00AM–12:00PM 4C-1, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Karin Leiderman**, University of North Carolina at Chapel Hill

**Robyn Shuttleworth**, Altos Labs  
**Lihong Zhao, PhD**, Virginia Tech  
**Christina Edholm**, Scripps College  
**Hwayeon Ryu**, Elon University

8:00AM  
▶ ◆ (128.1) *Advanced Image Analysis for Quantifying Morphological Features in Biodegradable Polymer Blends*  
**Hiruni Kamali Pallage**<sup>\*</sup>, Department of Mathematics, Centre College, **Yeon Hyang Kim**, Department of Mathematics, Central Michigan University, **Bingbing Li**, Department of Chemistry and Biochemistry, Central Michigan University and **Adam J.P. Bauer**, Department of Chemistry and Biochemistry, Central Michigan University (1203-92-44760)

8:30AM  
▶ ◆ (128.2) *Sex Differences in Glutathione Metabolism and Their Consequences*  
**Allison Cruikshank**<sup>\*</sup>, Duke University, **H. Frederik Nijhout**, Duke University and **Michael C Reed**, Duke University (1203-92-39148)

9:00AM  
▶ ◆ (128.3) *Mathematically Modeling Disease Transmission in Long-Term Care Facilities*  
**Cara Sulyok**, Lewis University, **Priscilla Doran**<sup>\*</sup>, Bryan College, **Natsuka Hayashida**, Brown University, **Kristen Joyner**, University of Tennessee, Knoxville, **Grace Moberg**, Colby College, **Austin Kind**, Lewis University, **Matthew Senese**, University of Notre Dame and **Brittany Stephenson**, Lewis University (1203-37-43476)

9:30AM  
▶ (128.4) *Bystander effect emerges from individual psychological prospects*  
**Sara M Clifton**<sup>\*</sup>, Denison University and **Tiffanie Ng**, Kenyon College (1203-91-37832)

10:00AM  
▶ ◆ (128.5) *Modeling Infectious Disease Dynamics: Fitting Network Models with Poisson-Distributed Contact Patterns*  
**Josephine Wairimu Kagunda**<sup>\*</sup>, The Ohio State University (1203-104-40294)

10:30AM  
▶ (128.6) *A Topological Data Analysis Study on Murine Pulmonary Arterial Trees with Pulmonary Hypertension*  
**Megan J Miller**<sup>\*</sup>, Virginia Military Institute, **Natalie Johnston**, North Carolina State University, **Ian Livengood**, North Carolina State University, **Miya Spinella**, North Carolina State University, **Radmila Sazdanovic**, North

Carolina State University and **Mette S Olufsen**, North Carolina State University (1203-54-45465)

11:00AM  
▶ ◆ (128.7) *Quantitative methods for Endosomal Escape*  
**Fnu Nisha**<sup>\*</sup>, Clemson University (1203-60-43549)

11:30AM  
▶ ◆ (128.8) *CANCELLED Improving Bacterial Growth Predictions with Agent-Based Models*  
**Sipkaduwa Arachchige Sashika Sureni Wickramasooriya**<sup>\*</sup>, University of California, Davis (1203-92-45281)

**(129) CRM-PIMS-AARMS Special Session on Indigenous Voices in Mathematics, III**

THURSDAY, JANUARY 09 8:00AM–12:00PM 615, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Kamuela E. Yong**, University of Hawai'i–West O'ahu

8:00AM  
▶ ◆ (129.1) *Bayesian Hierarchical Modeling of Sequential Growth Curve Data Applied to Admissions Data*  
**Joshua-Michael Kaonohilani Tomiyama**<sup>\*</sup>, University of Iowa and **Grant Brown**, University of Iowa (1203-62-41497)

8:30AM  
▶ ◆ (129.2) *Innovating Medical Robotics: Harnessing Data Science and AI*  
**Lilinoe Harbottle**<sup>\*</sup>, Indigenous Mathematicians (1203-104-43658)

9:00AM  
▶ ◆ (129.3) *Applied mathematics in academia and industry: From computational eigenvalue problems to discrete optimization*  
**Benjamin Quannah Parker**<sup>\*</sup>, Intel, Portland State University (1203-00-44168)

9:30AM  
▶ ◆ (129.4) *How I Got Started as a Mathematician in Industry at Desmos*  
**Marielle Chai Gardner**<sup>\*</sup>, Desmos Studio (1203-104-45417)

10:00AM  
▶ ◆ (129.5) *The Restriction of Movement and the Spread of Infectious Disease*  
**Keoni G. Castellano**<sup>\*</sup>, Virginia Tech (1203-92-40687)

10:30AM  
◆ (129.6) *Introducing the Picard Method for Approximating Solutions of Differential Equations with Neural Networks*  
**Ty Frazier**<sup>\*</sup>, University of Minnesota (1203-37-44680)

11:00AM  
▶ ◆ (129.7) *Examining the impact of higher order quadrature on solutions of inverse problems*  
**Miandra Ellis**<sup>\*</sup>, Arizona State University and **Rosemary Renaut**, Arizona State University (1203-15-43892)

11:30AM  
▶ ◆ (129.8) *Application of Existence Theorems for Periodic Solutions in Artificial Swarming*  
**Jito Vanualailai**<sup>\*</sup>, The University of the South Pacific (1203-93-43266)

**Employment Center**

THURSDAY, JANUARY 09 8:00AM–5:30PM **Grand Ballroom AB, Second Floor, Sheraton Grand Seattle**

Organizers: **Kayla M. Roach**, American Mathematical Society  
**Hannah Ortiz**, American Mathematical Society

***(130) MRC Algebraic Combinatorics, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM **Tahoma 5, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Kyle Celano**, Wake Forest University  
**Samuel Armon**, University of Southern California  
**Magda Hlavacek**, Pomona College  
**Alexander N Wilson**, Oberlin College  
**Spencer Daugherty**, University of Colorado Boulder

8:00AM *Inversions on  $\ell$ -interval Parking Functions*  
► ◆ (130.1)

**Kimberly P. Hadaway**<sup>\*</sup>, Iowa State University, **Kyle Celano**, Wake Forest University, **Ari Cruz**, University of Wisconsin-Milwaukee, **Jennifer Elizabeth Elder**, Missouri Western State University, **Pamela Estephania Harris**, University of Wisconsin, Milwaukee, **Jeremy L. Martin**, University of Kansas, **Amanda Priestley**, The University of Texas at Austin, **Keith Sullivan**, The University of Vermont and **Gabe Roland Udell**, Cornell University (1203-05-44070)

8:30AM *The lattice of maximal tubings of the cycle graph*  
► ◆ (130.2)

**Katie Waddle**<sup>\*</sup>, University of Michigan (1203-06-43724)

9:00AM *Progress on Showing a Poset of Maximal Tubings is Semidistributive*  
► (130.3)

**George Nasr**<sup>\*</sup>, Augustana University and **Benjamin Adenbaum**, Dartmouth College (1203-05-40740)

9:30AM *Inversion sets of the Poset of the Cyclohedron*  
(130.4)

**Bryson Kagy**<sup>\*</sup>, North Carolina State University and **Nathan Lesnevich**, Oklahoma State University (1203-05-44920)

10:00AM *Quasisymmetric functions for maximal length chains in tubing lattices of filled graphs*  
(130.5)

**Manuel Concha**, Universidad de Talca, **Susanna Dodds Fishel**, Arizona State University, **Hsin-Chieh Liao**, Washington University in St. Louis and **Andrew Reimer-Berg**<sup>\*</sup>, Colorado State University (1203-05-45098)

10:30AM *Primeness of Vector Parking Functions*  
► ◆ (130.6)

**Lucy Martinez**<sup>\*</sup>, Rutgers University, **Sam Armon**, University of Southern California, **Joanne Beckford**, Bryn Mawr College, **Dillon Hanson**, Jacksonville University, **Naomi Krawzik**, Sam Houston State University, **Olya Mandelshtam**, University of Waterloo and **Catherine Huafei Yan**, Texas A&M University (1203-05-41211)

11:00AM *And now two-dimensions: Prime  $(p,q)$ -parking functions*  
► (130.7)

**Dillon Hanson**<sup>\*</sup>, Jacksonville University (1203-05-40170)

11:30AM *The Immersion Poset on Partitions*

► ◆ (130.8)  
**Lisa Johnston**<sup>\*</sup>, University of California, Davis, **David Kenepf**, University of California, Davis, **Evuilynn Nguyen**, University of California, Davis, **Digjoy Paul**, Indian Institute of Science, Bangalore, **Anne Schilling**, University of California, Davis, **Mary Claire Simone**, University of California, Davis and **Regina Zhou**, University of California, Davis (1203-05-44244)

***(131) MRC Climate Science at the Interface Between Topological Data Analysis and Dynamical Systems Theory, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM **Tahoma 1, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Wenwen Li**, St. Mary's College of Maryland  
**Cameron Edgar**, Williams College  
**Sushovan Majhi**, George Washington University  
**Daniela Beckelhymer**, University of Minnesota, Twin Cities

8:00AM *Bridging Climate Science, Topology, and Dynamical Systems: New Frontiers in Weather Regime Analysis*  
► ◆ (131.1)

**Maria Isabel Sanchez Muniz**<sup>\*</sup>, University of Minnesota, Twin Cities (1203-92-44568)

9:00AM *Using Directed Topology to Understand 2-Parameter Persistence*  
► ◆ (131.2)

**Robyn Kaye Brooks**<sup>\*</sup>, University of Utah (1203-55-41203)

9:30AM *Alternative Filtrations for Detecting Topological Structures in Dynamical Systems*  
► (131.3)

**Soheyl Anbouhi**<sup>\*</sup>, Western Carolina University (1203-55-43142)

10:00AM *Break/Discussion*

10:30AM *Delaunay-type (bi)Filtrations in Dynamical Systems*  
(131.5)

**Tung Lam**<sup>\*</sup>, University at Albany, SUNY (1203-55-44122)

11:00AM *Identifying orbits in atmospheric dynamical systems through temporally enriched mapper graphs*  
► (131.6)

**Halley Fritze**<sup>\*</sup>, University of Oregon (1203-62-41939)

***(132) MRC Homotopical Combinatorics, I***

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THURSDAY, JANUARY 09 8:00AM–12:00PM **Tahoma 2, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Millie Rose**, University of Kentucky  
**Valentina Zapata Castro**, University of Virginia

- Danika Van Niel**, Michigan State University  
**Devin Hensley**, Auburn University
- 8:00AM ▶ (132.1) *Poly-Bernoulli numbers and matchstick games on cylinders*  
**Kyle M Ormsby**<sup>\*</sup>, Reed College, **Caoilainn Kirkpatrick**, Reed College, **Amelie el Mahmoud**, Reed College, **Dale Schandelmeier-Lynch**, Reed College, **Riley Shahr**, University of Pennsylvania, **Lixing Yi**, Reed College, **Avery Young**, Reed College and **Angélica M Osorno**, Reed College (1203-05-43267)
- 8:30AM (132.2) *Realizing Compatible Pairs of Transfer Systems*  
**David Chan**, Michigan State University, **Myungsin Cho**, Indiana University, **David Mehrle**<sup>\*</sup>, University of Kentucky, **Pablo S. Ocal**, University of California, Los Angeles, **Angélica M Osorno**, Reed College, **Benjamin Szczesny**, Ohio State University and **Paula Verdugo**, Macquarie University (1203-55-40364)
- 9:00AM ◆ (132.3) *The edge reconstruction conjecture via combinatorial K-theory*  
**Maxine Elena Calle**<sup>\*</sup>, University of Pennsylvania and **Julian Joseph Gould**, University of Pennsylvania (1203-19-44194)
- 9:30AM ◆ (132.4) *Model Structures On Lattices*  
**Sofia Rose Martinez Alberga**<sup>\*</sup>, Purdue University, **Daniel Tolosa**, Purdue University, **Constanze Roitzheim**, University of Kent, **Shuchita Goyal**, Krea University, **Andres Carnero Bravo**, UNAM, **Devin Hensley**, Auburn University and **Cherry Ng**, University of Colorado Boulder (1203-18-37960)
- 10:00AM ▶ (132.5) *The cocharacteristic function and cosaturated Transfer Systems.*  
**Jishnu Bose**, University of Southern California, **Tien Chih**<sup>\*</sup>, Oxford College of Emory University, **Hannah Housden**, Vanderbilt University, **Legrand Jones II**, Indiana University, **Chloe Lewis**, University of Wisconsin - Eau Claire, **Kyle Ormsby**, Reed College and **Millie Rose**, University of Kentucky (1203-05-40273)
- 10:30AM (132.6) *Generating Sets for Transfer Systems on Cubes*  
**Katharine Adamyk**<sup>\*</sup>, Hamline University, **Scott Balchin**, Queen's University Belfast, **Miguel Barrero**, University of Aberdeen, **Steven Scheirer**, Susquehanna University, **Yuri Sulyma**, Industry, **Noah Wisdom**, Northwestern University and **Valentina Zapata Castro**, Univ of Virginia (1203-55-43544)
- 11:00AM ◆ (132.7) *Transfer and Factorization Systems on Non-Poset Categories*  
**Jishnu Bose**, University of Southern California, **Tien Chih**, Oxford College of Emory University, **Hannah Housden**<sup>\*</sup>, Vanderbilt University, **Legrand Jones II**, Indiana University, **Chloe Lewis**, University of Wisconsin Eau Claire, **Kyle M Ormsby**, Reed College and **Millie Rose**, University of Kentucky (1203-55-44111)
- 11:30AM (132.8) *A fibration for decomposing transfer system lattices*  
**Michael Hill**, University of Minnesota and **Jonathan L. Rubin**<sup>\*</sup>, Unaffiliated (formerly UCLA) (1203-06-40807)
- (133) MRC Mathematics of Adversarial, Interpretable, and Explainable AI, I**
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- THURSDAY, JANUARY 09 8:00AM–12:00PM Chelan 5, Level 2, Seattle Convention Center Arch at 800 Pike**
- Organizers: **Lander ver Hoef**, Cooperative Institute For Research In the Atmosphere (CIRA)  
**Morgan Weiler**, Cornell University  
**Siddharth Vishwanath**, University of California, San Diego  
**Anna Aboud**, Westmont College
- 8:00AM (133.1) *A Mathematical Exploration of Attention Mechanisms*  
**Emily J King**<sup>\*</sup>, Colorado State University (1203-41-44542)
- 9:00AM ▶ (133.2) *On the limits of neural network explainability via descrambling*  
**Shashank Sule**<sup>\*</sup>, University of Maryland, **Richard G Spencer**, National Institute on Aging, National Institutes of Health and **Wojciech Czaja**, University of Maryland (1203-68-44771)
- 9:30AM ◆ (133.3) *Unveiling Large Language Model Vulnerabilities: A Geometric and Topological Approach to Adversarial Robustness*  
**Rayna Andreeva**, University of Edinburgh, **Paul Samuel Ignacio**, University of the Philippines Baguio, **Michael Igorevich Ivanitskiy**, Colorado School of Mines, **Evgeniya Lagoda**, Freie Universität Berlin, **Morgan Weiler**, University of California, Riverside, **Yangxinyu Xie**<sup>\*</sup>, University of Pennsylvania, Argonne National Laboratory and **Yue Zhao**, Peking University (1203-68-44487)
- 10:00AM ▶ ◆ (133.4) *How do neural networks solve geometric problems?*  
**Samantha Chen**<sup>\*</sup>, University of California - San Diego (1203-68-44308)
- 10:30AM ▶ (133.5) *Efficient algorithm for non-negative smooth interpolation*  
**Fushuai Jiang**<sup>\*</sup>, University of Maryland, College Park (1203-26-42135)
- 11:00AM ▶ (133.6) *Almost-Exact Matching for Interpretable and Trustworthy Causal Inference*  
**Quinn Michael Lanners**<sup>\*</sup>, Duke University, **Harsh Parikh**, Johns Hopkins University, **Srikar Katta**, Duke University, **David Page**, Duke University, **Cynthia Rudin**, Duke University and **Alexander Volfovsky**, Duke University (1203-68-40332)
- 11:30AM ▶ (133.7) *Classification of attention heads in Large Language Models via understanding attention patterns as networks*

Michael Igorevich Ivanitskiy\*, Colorado School of Mines (1203-68-45554)

**(134) NAM Haynes-Granville-Browne Session of Presentations by Recent Doctoral Recipients**

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THURSDAY, JANUARY 09 8:00AM–12:00PM 3A, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Torina D. Lewis**, National Association of Mathematicians  
**Asamoah Nkwanta**, Morgan State University  
**Aris Winger**, Georgia Gwinnett College

8:00AM  
◆ (134.1) *Core Epigenetic Module Biomarkers among Various PTSD Subtypes*  
**Dewayne Dixon\***, Hampton University (1203-92-46497)

8:30AM  
▶ ◆ (134.2) *Learning regulatory contributions to gene expression in grasses*  
**Taylor H Ferebee\***, Corteva Agriscience, Cornell University (1203-92-41641)

9:00AM  
▶ ◆ (134.3) *CANCELLED Predicting Malaria Trends in São Tomé and Príncipe: Integrating Statistical and Deep Learning Models with Climate and Vector Control Data*  
**Sipkaduwa Arachchige Sashika Sureni Wickramasooriya\***, University of California, Davis (1203-92-45229)

9:30AM  
▶ ◆ (134.4) *Presentations of Derived Categories*  
**Reginald Cyril Wallis Anderson\***, Claremont McKenna College (1203-14-42693)

10:00AM  
▶ ◆ (134.5) *Optimal control of Covid-19 interventions in public health management*  
**Romario Gildas Foko Tiomela\***, Morgan State University (1203-49-40448)

10:30AM  
▶ ◆ (134.6) *Honoring Legacy: Centering Black Girls in Mathematics Through AI and Culturally Relevant Education*  
**Michole Enjoli Washington\***, STEMulation (1203-97-41990)

**(135) SIAM Minisymposium on Scientific Machine Learning: Recent Advances and Future Directions, I**

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THURSDAY, JANUARY 09 8:00AM–12:00PM 2B, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Steven Lee**, Department of Energy – Office of Science  
**Panagiotis Stinis**, Pacific Northwest National Laboratory

8:00AM *Introductory Remarks*

8:30AM  
▶ (135.2) *Scientific Machine Learning at Pacific Northwest National Laboratory*  
**Amanda Howard\***, Pacific Northwest National Laboratory and **Panagiotis Stinis**, Pacific Northwest National Laboratory (1203-68-43582)

9:00AM  
(135.3) *Scientific Machine Learning in Industrial Pipelines, Surrogates and Model Reduction*  
**Marta D'Elia\***, Stanford University (1203-35-43583)

9:30AM *Break*

10:00AM  
(135.5) *Learning Coarse-Grained Dynamics on Graph*  
**John Harlim\***, The Pennsylvania State University (1203-68-39862)

10:30AM  
▶ (135.6) *Foundational Methods for Foundation Models for Scientific Machine Learning*  
**Michael W Mahoney**, ICSI / LBNL / UC Berkeley and **Michael W Mahoney\***, ICSI / LBNL / UC Berkeley (1203-62-43229)

11:00AM *Panel discussion "Mathematics for scientific machine learning"*

**(136) AMS Contributed Paper Session on Biology and Other Natural Sciences, II**

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THURSDAY, JANUARY 09 8:15AM–12:00PM 308, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

8:15AM  
▶ (136.1) *Optimizing Dengue Control Using Wolbachia and Larval Predators in Mathematical Models*  
**Vinodh Kumar Chellamuthu\***, Utah Tech University (1203-34-41025)

8:30AM  
▶ (136.2) *Vaccination Games of Boundedly Rational Parents toward New Childhood Immunization*  
**Wei Yin\***, University of Texas Rio Grande Valley and **Tamer Oraby**, The University of Texas Rio Grande Valley (1203-92-44435)

8:45AM  
▶ (136.3) *A Data-Driven Clonal Expansion Model of Cancer Incidence Incorporating Tumor Size at Diagnosis*  
**Navid Mohammad Mirzaei\***, Columbia University Mailman School of Public Health, **Wan Yang**, Columbia University Mailman School of Public Health, **Piero Dalerba**, Center for Discovery and Innovation (CDI), Hackensack Meridian Health (HMH), **Chin Hur**, Columbia University Irving Medical Center and **Mary Beth Terry**, Columbia University, Mailman School of Public Health (1203-92-44305)

9:00AM  
▶ ◆ (136.4) *Human mobility drives county-wise spatio-temporal models and network dynamics in strengthening the epidemic preparedness*  
**Haridas K. Das\***, Oklahoma St Univ and **Lucas M. Stolerman**, Oklahoma State University (1203-92-45284)

9:15AM  
▶ (136.5) *A Reaction-Diffusion Model of Vascular Tumor Growth: Bifurcation, Stability, Periodic Behavior and Relapse*  
**Priscilla Owusu Sekyere\***, University of Missouri-Kansas City (1203-92-45380)

9:30AM  
▶ (136.6) *Novel Therapeutics in Pharmacological Management of Cancer Pain Relief: A Connection to Computational Neurobiology*  
**Rajvi Babaria\***, Johns Hopkins University (1203-92-39424)

- 9:45AM (136.7) *CANCELLED- MCMC samplers for single-molecule fluorescence data analysis and step counting*  
**Chiara Mattamira**<sup>\*</sup>, University of Tennessee, Knoxville and **Ioannis Sgouralis**, University of Tennessee, Knoxville (1203-92-45495)
- 10:00AM (136.8) *Understanding the effectiveness of a capsid assembly modulator (CAM) in the treatment of chronic HBV*  
**Sarafa Adewale Iyaniwura**<sup>\*</sup>, Fred Hutchinson Cancer Center (1203-92-39357)
- 10:15AM (136.9) *Modeling subjectivity in bacterial vaginosis diagnoses*  
**Johnathan Shih**<sup>\*</sup>, Ragon Institute of Mass General, MIT, and Harvard, Cambridge, MA, USA, **Joseph Elsherbini**, Ragon Institute of Mass General, MIT, and Harvard, Cambridge, MA, USA, **Douglas Kwon**, Ragon Institute of Mass General, MIT, and Harvard, Cambridge, MA, USA, Division of Infectious Diseases, Massachusetts General Hospital, Boston, MA, USA, Harvard Medical School, Boston, MA, USA, **Caroline Mitchell**, Vincent Center for Reproductive Biology, Massachusetts General Hospital, Boston, MA, USA and **Laura Symul**, ISBA, UCLouvain, Louvain la Neuve, Belgium (1203-92-44392)
- 10:30AM (136.10) *A stochastic model for Wolbachia growth*  
**Joseph Klobusicky**<sup>\*</sup>, The University of Scranton (1203-92-42228)
- 10:45AM (136.11) *Modeling effects of explicit tradeoffs on the evolution of dispersal*  
**Cleveland Stockman**<sup>\*</sup>, Auburn University Montgomery, **Christian VanErmen**, Auburn University Montgomery and **Jerome Goddard**, Auburn University Montgomery (1203-92-43601)
- 11:00AM (136.12) *Exploring effects of patch size, matrix quality, and functional response on prey populations*  
**Jaron Acreman**<sup>\*</sup>, Auburn University Montgomery, **Peyton Baker**, Auburn University Montgomery, **Damien Bogan**, Auburn University Montgomery and **Jerome Goddard**, Auburn University Montgomery (1203-92-43614)
- 11:15AM (136.13) *CANCELLED A graph construction for analysing the parametric asymptotics of Markov processes*  
**Sabina Jehan Haque**<sup>\*</sup>, Department of Mathematics and Complex Systems, University of Michigan Ann Arbor, Ann Arbor MI, **Kee Myoung Nam**, Department of Molecular, Cellular and Developmental Biology, Yale University, New Haven CT and **Jeremy Gunawardena**, Department of Systems Biology, Harvard University, Boston MA (1203-92-45205)

***(137) AIM Special Session on Math Circles for Makers, Creators, and Artists, III***

**THURSDAY, JANUARY 09 8:30AM–12:00PM 3B, Level Three, Seattle Convention Center Arch at 705 Pike**

- Organizers: **Tom G. Stojsavljevic**, Beloit College  
**Gabriella A. Pinter**, University of Wisconsin, Milwaukee  
**Jeffrey Musyt**, Slippery Rock University  
**A. Gwinn Royal**, Ivy Tech Community College  
**Lauren L Rose**, Association for Women in Mathematics  
**Nikolas Rauh**, Seattle Universal Math Museum
- 8:30AM (137.1) *Storytelling and performing with giant mathematical manipulatives*  
**Karl Schaffer**<sup>\*</sup>, De Anza College (1203-104-45679)
- 9:00AM (137.2) *Lines of Sight: Mathematics of Visual Perspective and Anamorphic Art*  
**Anna A Davis**<sup>\*</sup>, Ohio Dominican University (1203-102-40453)
- 9:30AM (137.3) *Recreational Math from the Book Series La Science Amusante by Tom Tit, Librairie Larousse-Paris*  
**Lauren Siegel**<sup>\*</sup>, Math Happens Foundation (1203-01-40356)
- 10:00AM *Break*
- 10:30AM (137.5) *Math behind the Truncated Polyhedra Jewelry and Ornaments*  
**Violeta Vasilevska**<sup>\*</sup>, Utah Valley University (1203-97-42652)
- 11:00AM (137.6) *Body Art and Geometry*  
**Rodi Steinig**<sup>\*</sup>, Math Renaissance and **Gina Gilbert**, Math Renaissance (1203-101-43347)
- 11:30AM (137.7) *The Nexus of Henna Body Art and Geometry*  
**Gina Gilbert**<sup>\*</sup>, Math Renaissance (1203-101-44023)

***(138) AMS Special Session on AI Meets Cryptography, II***

**THURSDAY, JANUARY 09 8:30AM–12:00PM 612, Level Six, Seattle Convention Center Arch at 705 Pike**

- Organizers: **Shi Bai**, Florida Atlantic University  
**Emily Wenger**, Meta AI  
**Kristin E. Lauter**, Facebook
- 8:30AM (138.1) *A Decade of iDASH Workshop: Pioneering Homomorphic Encryption for Genomic Privacy and Security*  
**Xiaoqian Jiang**<sup>\*</sup>, University of Texas Health Science Center at Houston, **Miran Kim**, Hanyang University and **Arif Harmanci**, University of Texas Health Science Center at Houston (1203-11-42987)
- 9:30AM (138.2) *Exploring Private AI Solutions Through Fully Homomorphic Encryption (FHE)*  
**Duhyeong Kim**<sup>\*</sup>, Intel Labs (1203-68-43329)
- 10:00AM (138.3) *Towards practical privacy-preserving linear regression of clinical data*  
**Shi Bai**<sup>\*</sup>, Florida Atlantic University (1203-68-43868)

10:30AM *Benchmarking Attacks on Learning with Errors*  
(138.4) **Emily Wenger**<sup>\*</sup>, Duke University, **Eshika Saxena**, Meta AI, **Mohamed Malhou**, Meta AI, **Ellie Thieu**, University of Wisconsin - Madison and **Kristin E. Lauter**, Meta AI (1203-06-38935)

11:30AM *How AI learns modular arithmetic*  
▶ (138.5) **Andrey Gromov**<sup>\*</sup>, Meta FAIR (1203-11-45159)

***(139) AMS Special Session on Random Walks on Graphs and Related Parameters, I***

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THURSDAY, JANUARY 09 8:30AM–12:00PM Tahoma 3, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Jane Breen**, Ontario Tech University  
**Sooyeong Kim**, York University  
**Mark Kempton**, Brigham Young University

8:30AM *Some spectral properties of the non-backtracking matrix of a graph*  
▶ (139.1) **Cory Glover**<sup>\*</sup>, Northeastern University and **Mark Kempton**, Brigham Young University (1203-05-45296)

9:00AM *Defective eigenvalues of the non-backtracking matrix*  
◆ (139.2) **Kristin Heysse**, Macalester College, **Kate J. Lorenzen**<sup>\*</sup>, Linfield University and **Carolyn Reinhart**, Swarthmore College (1203-05-38112)

9:30AM *Break*

10:00AM *Multiphase Markov Chains*  
▶ (139.4) **Stephen J Young**<sup>\*</sup>, Pacific Northwest National Laboratory, **Sinan Aksoy**, Pacific Northwest National Laboratory, **Tobias Hagge**, Pacific Northwest National Laboratory and **Bill Kay**, Pacific Northwest National Laboratory (1203-05-42867)

10:30AM *On the last new vertex visited by a random walk in a directed graph*  
▶ (139.5) **Calum Buchanan**<sup>\*</sup>, University of Vermont, **Paul Horn**, University of Denver and **Puck Rombach**, University of Vermont (1203-05-45165)

11:00AM *Random walking on a graph and on its complement*  
▶ (139.6) **Neal Madras**<sup>\*</sup>, York University and **Sooyeong Kim**, University of Guelph (1203-60-42167)

***Panamanian Foundation for the Promotion of Mathematics (FUNDAPROMAT) Presents- Stories of Resilience in the Mathematical Community***

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THURSDAY, JANUARY 09 8:30AM–10:00AM 4C-4, Level Four, Seattle Convention Center Arch at 705 Pike

Join our storytelling event in which invited guests from the mathematical community will share stories about challenges they have faced and how they dealt with these difficulties. Speakers from a wide variety of life experiences

will illustrate how they built their resilience to help them thrive.

Organizers: **Jeanette Shakalli**, Panamanian Foundation for the Promotion of Mathematics (FUNDAPROMAT)  
**Aaron D. Wootton**, University of Portland

***SIAM Panel on Shedding Light on Opportunities for Applied Mathematicians in Industry and Government***

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THURSDAY, JANUARY 09 8:30AM–10:00AM 603, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Sharon F Arroyo**, The Boeing Company  
**Nessy Tania**, Pfizer

***SIGMAA Workshop: Team-worthy Activities for Discrete Mathematics Instruction***

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THURSDAY, JANUARY 09 8:30AM–10:00AM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike

Interested in using carefully designed team-worthy activities as a replacement for some lectures in lower-division discrete mathematics? At this workshop you will learn about seven team-worthy tasks (designed for 50- to 75-min classes) and associated faculty-learning modules about how to orchestrate classroom use of such activities. Workshop participants will engage in student activities, experience some of the faculty-learning modules, and get access to all materials.

Organizers: **Tim Hsu**, San José State University  
**Shandy Hauk**, San Francisco State University  
**Jesus Gonzalez**, West Valley College  
**Tim Hsu**, San José State University  
**Shandy Hauk**, San Francisco State University

***(140) AMS Contributed Paper Session on Number Theory and Field Theory, II***

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THURSDAY, JANUARY 09 9:00AM–11:30AM 305, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

9:00AM *A Proof of Hecke's Formula for Binary Quadratic Forms*  
(140.1) **Dr. Frank Patane**<sup>\*</sup>, Samford University (1203-11-43541)

9:15AM *Supercongruences arising from Ramanujan-Sato Series*  
(140.2) **Angelica Babei**, Howard University, **Manami Roy**, Lafayette College, **Holly Swisher**, Oregon State University, **Bella Tobin**<sup>\*</sup>, Agnes Scott College and **Fang-Ting Tu**, Louisiana State University (1203-11-44438)

9:30AM *An Algorithm for Isolated Points on  $\$X_0(n)\$$*   
▶ (140.3) **Meghan Hsin-Ru Lee**<sup>\*</sup>, Wake Forest University (1203-11-43497)

- 9:45AM  
◆ (140.4) *Adinkras as Origami*  
**Edray Herber Goins\***, Pomona College (1203-11-39517)
- 10:00AM  
(140.5) *Some improvements on the Davenport-Heilbronn method*  
**Konstantinos Kydoniatis\***, Kansas State University (1203-11-44083)
- 10:15AM  
(140.6) *On Certain Polytopes Associated to Products of Algebraic Integer Conjugates*  
**Seda Albayrak**, University of Calgary, **Samprit Ghosh**, University of Calgary, **Greg Knapp\***, University of Calgary and **Dang-Khoa Nguyen**, University of Calgary (1203-11-43458)
- 10:30AM  
▶ (140.7) *All admissible  $k$ -tuples arise and persist in Eratosthenes sieve*  
**Fred B. Holt\***, independent (1203-11-42462)
- 10:45AM  
◆ (140.8) *Arithmetic constants for symplectic problems*  
**Vivian Kuperberg**, ETH Zurich and **Matilde N. Lalin\***, Université de Montréal (1203-11-43714)
- 11:00AM  
▶ ◆ (140.9) *Geometry of Unit Lattices in  $\mathbb{Z}[D_4]$ -Quartic Extensions*  
**Sergio Ricardo Zapata Ceballos\***, Lakehead University (1203-11-43930)

***(141) AMS Special Session on Dynamics of Continued Fractions and Related Systems, I***

**THURSDAY, JANUARY 09 9:00AM–12:00PM 310, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Joseph Andrew Vandehey**, University of Texas at Tyler  
**Anton Lukyanenko**, George Mason University, Fairfax

- 9:00AM  
(141.1) *Normality and non-normality results for continued fractions*  
**Joseph Andrew Vandehey\***, University of Texas at Tyler (1203-11-44237)
- 9:30AM  
▶ (141.2) *The distribution of reduced quadratic irrationals arising from continued fraction expansions*  
**Maria Siskaki\***, Yale University (1203-11-44049)
- 10:00AM  
(141.3) *Generalized continued fractions iterated systems and their Hausdorff dimension spectrum with applications to Luroth systems*  
**Eugen Andrei Ghenciu\***, University of Wisconsin-Stout (1203-37-44389)
- 10:30AM  
(141.4) *Rigorous Numerical Dimension Estimates for Higher Dimensional Continued Fractions*  
**Erik Wendt\***, University of Connecticut, **Vasileios Chousionis**, University of Connecticut, **Dmitriy Leykekhman**, University of Connecticut and **Mariusz Urbanski**, University of North Texas (1203-37-40106)
- 11:00AM  
(141.5) *Distribution of gaps between slopes of saddle connections in genus 2*  
**Joshua P. Bowman\***, Pepperdine University and **Anthony Sanchez**, University of California San Diego (1203-37-45733)

- 11:30AM  
▶ (141.6) *Algebraic Number Starscapes*  
**Katherine E. Stange\***, University of Colorado, Boulder, **Steve Trettel**, University of San Francisco and **Edmund O. Harriss**, University of Arkansas (1203-11-38874)

***(142) AMS Special Session on Variational Methods in Quantum Computing, I***

**THURSDAY, JANUARY 09 9:00AM–12:00PM 606, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Michael Ragone**, University of California, Davis

- Jason Saied**, NASA Ames Research Center  
**Carlos Ortiz Marrero**, Pacific Northwest National Laboratory
- 9:00AM  
(142.1) *Assessing and Advancing the Potential of Quantum Computing A NASA Case Study*  
**Eleanor Rieffel\***, NASA Ames Research Center (1203-81-44864)
- 9:30AM  
▶ (142.2) *New variational algorithms for quantum computers*  
**Mohan Sarovar\***, Sandia National Laboratories (1203-81-45252)
- 10:00AM  
▶ (142.3) *Benchmarking NISQ Devices with Non-Local Quantum Strategies*  
**Sarah Chehade**, Oak Ridge National Laboratory, **Jim Furches\***, Georgia Institute of Technology, Pacific Northwest National Laboratory, **Kathleen Hamilton**, Oak Ridge National Laboratory, **Carlos Ortiz Marrero**, Pacific Northwest National Laboratory and **Nathan Wiebe**, University of Toronto. (1203-81-43716)
- 10:30AM  
▶ (142.4) *Superpolynomial improvement in precision for quantum simulations of coupled quantum-classical dynamics*  
**Sophia Simon\***, University of Toronto (1203-81-43228)
- 11:00AM  
▶ (142.5) *Adaptive variational quantum algorithms*  
**Yanzhu Chen\***, Florida State University (1203-81-41483)
- 11:30AM  
(142.6) *Open Problem Session A*  
**Eleanor Rieffel\***, NASA Ames Research Center (1203-81-44847)
- (143) ASL Special Session on Combinatorial Set Theory, I***
- THURSDAY, JANUARY 09 9:00AM–11:30AM 2A, Level Two, Seattle Convention Center Arch at 705 Pike**
- Organizers: **Spencer Unger**, University of Toronto  
**James W Cummings**, Carnegie Mellon University
- 9:00AM  
(143.1) *CANCELLED On Properties Preserved by Dense Chu Transforms*  
**Mirna Dzamonja\***, IRIF (CNRS & Université de Paris Cité) and **Francesco Parente**, Kobe University, Japan (1203-03-40795)

9:30AM *Commutativity and Ultrapower Characterization of the Tukey Order*  
(143.2) **Tom Benhamou**<sup>\*</sup>, Rutgers University (1203-03-42460)

10:00AM *Break*

10:30AM *All you need is HOD*  
▶ ◆ **Alejandro Poveda**<sup>\*</sup>, Harvard University (1203-03-42665)  
(143.4)

11:00AM *Forcing and Borel equivalence relations*  
(143.5) **Dima Svetosla Sinapova**<sup>\*</sup>, Rutgers University and **Filippo Calderoni**, Rutgers University (1203-03-43531)

### Exhibits and Book Sales

THURSDAY, JANUARY 09 9:00AM–5:00PM Hall 4A, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

### JMM Networking Center - Skybridge

THURSDAY, JANUARY 09 9:00AM–5:30PM Hall 4D - Skybridge, Level Four, Seattle Convention Center Arch at 705 Pike

JMM Networking Center - Skybridge

Organizer: **AMS Meetings Department**, AMS

### JMM Networking Center - Tahoma Foyer

THURSDAY, JANUARY 09 9:00AM–5:30PM Tahoma Foyer, Level Three, Seattle Convention Center Arch at 800 Pike

JMM Networking Center - Tahoma Foyer

Organizer: **AMS Meetings Department**, American Mathematical Society

### Professional Enhancement Program (PEP) 5B: Quantum-Accelerated Supercomputing for the Mathematics Classroom

THURSDAY, JANUARY 09 9:00AM–11:00AM Willow A, Second Floor, Sheraton Grand Seattle

Quantum computing and artificial intelligence are cutting-edge technologies poised to accelerate high performance supercomputing. Their impact is significantly boosted by capabilities of multi-GPU systems. This interactive tutorial introduces attendees to the fundamentals of quantum computing through a mathematical lens. Attendees will take away materials to integrate quantum-accelerated supercomputing examples into various mathematics courses, including linear algebra and optimization.

Organizer: **Monica VanDieren**, NVIDIA

### (144) SIGMAA Special Session on Mathematics and the Arts, II

THURSDAY, JANUARY 09 9:00AM–12:00PM 610, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Doug Norton**, Villanova University  
**Karl M Kattchee**, University of Wisconsin-La Crosse  
**Anil Venkatesh**, Adelphi University

9:00AM *Exploration of Symmetrical Simulation on Orbifolds*  
▶ (144.1) **Vladimir Bulatov**<sup>\*</sup>, bulatov.org (1203-104-42419)

9:30AM *An Embroidered Hyperbolic Pattern of Shells*  
▶ (144.2) **Douglas J Dunham**<sup>\*</sup>, University of Minnesota Duluth and **Lisa Shier**, University of Maryland Global Campus (1203-104-42986)

10:00AM *Celebrating Circle Tangencies: Geogebra and Constructed Art*  
▶ (144.3) **Frank A Farris**<sup>\*</sup>, Santa Clara University (1203-104-44087)

10:30AM *Poincaré Blues*  
▶ (144.4) **Susan Goldstine**<sup>\*</sup>, St. Mary's College of Maryland (1203-104-44454)

11:00AM *Truchet Cubes: A Public Engagement Activity*  
▶ (144.5) **David A Reimann**<sup>\*</sup>, Albion College, National Museum of Mathematics (1203-104-45654)

11:30AM *Creating the World's Largest Sierpinski Triangle out of K'NEX pieces*  
▶ (144.6) **Victor J Donnay**<sup>\*</sup>, Bryn Mawr College (1203-104-43721)

### (145) SLMATH (MSRI) Special Session on MSRI-UP 2024 Mathematical Endocrinology, I

THURSDAY, JANUARY 09 9:00AM–11:00AM 611, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Erica Graham**, Bryn Mawr College  
**Candice Price**, Smith College

9:00AM *MSRI-UP 2024 Mathematical Endocrinology*  
▶ ◆ **Candice Price**<sup>\*</sup>, Smith College (1203-00-45010)  
(145.1)

9:30AM *Modeling the Loss of the Menstrual Cycle in AFAB Individuals Receiving Testosterone Replacement Therapy*  
▶ ◆ **Ayezah Dar**<sup>\*</sup>, Bowdoin College, **Caro McGinis Faust**, Smith College and **Raymond Sauerwin**, Spring Hill College (1203-92-41685)  
(145.2)

10:00AM *Proposed Mathematical Model of the Cyclic Relationship Between Estradiol and Endometriosis Lesions*  
▶ ◆ **McKenzie Skrastins**<sup>\*</sup>, The State University of New York at Binghamton, **Camilla Nunez Polanco**, University of Massachusetts, Amherst, **Russell J Martinez**, California Institute of Technology, **Erica Graham**, Bryn Mawr College, **Candice Price**, Smith College and **Issa Susa**, University of California, Davis (1203-92-41701)  
(145.3)

10:30AM *Impacts of Chronic Stress on Type 2 Diabetes*  
▶ ◆ **Kris Mae Pasia**<sup>\*</sup>, Bryn Mawr College, **Kenny Banks**, University of North Carolina,  
(145.4)

Greensboro and **Yamir Adas Richmond**,  
Morehouse College (1203-92-43098)

***Spectra Workshop: Accessibility & Inclusivity in a Math Classroom: Union & Intersection of LGBTQ+ and Disability***

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**THURSDAY, JANUARY 09 9:00AM–10:50AM 400, Level Four, Seattle Convention Center Arch at 705 Pike**

In response to the heightened focus on recruiting and retaining underrepresented and marginalized students in higher education, this workshop is aimed at addressing the obstacles and potentials in enhancing undergraduate math curricula for improved student support. Participants will engage in discussions centered around the unique challenges experienced by LGBTQ+ and students with disabilities, while collaboratively developing strategies aimed at fostering their success in math classrooms.

Organizers: **Sarah Heuss**, University of South Carolina - Union  
**Devavrat Dabke**, Level Ventures  
**Apoorva Mate**, University of Mississippi

***MAA Project NEXt: Integrating into a New Institution***

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**THURSDAY, JANUARY 09 9:15AM–10:30AM 609, Level Six, Seattle Convention Center Arch at 705 Pike**

The aim of this panel is to discuss ideas, insights, and experiences around new positions—from accepting an offer to navigating promotion and tenure. Our panel is geared towards early career mathematicians in academia, including non-tenure track and tenure-track faculty. Some of the topics will include setting goals for the future, finding opportunities and time for professional development, negotiating and using your start-up package wisely, building a network at your institution.

Organizers: **Stacie Baumann**, Auburn University  
**Manami Roy**, Lafayette College  
**Prairie Wentworth-Nice**, Johns Hopkins University  
**Yasasya Batugedara**, Michigan Technological University  
**Rolando de Santiago**, Purdue University  
**Edray Herber Goins**, Pomona College  
**Elizabeth Graf Jurisich**, College of Charleston  
**Melinda Dawn Lanius**, Auburn University

***Math Meets Policy: Advocating for Change***

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**THURSDAY, JANUARY 09 9:30AM–11:00AM 4C-3, Level Four, Seattle Convention Center Arch at 705 Pike**

This session will be a discussion of ways to engage with elected officials in addressing policy issues of concern to the mathematics community, including research funding and education. Panelists will discuss the importance of grassroots advocacy and building relationships with legislator to further goals.

Organizers: **Tyler Kloefkorn**, American Mathematical Society

**Jerry McNerney**, U. S. Congress, retired  
**Karen Saxe**, American Mathematical Society  
**Karen Saxe**, American Mathematical Society  
**Kevin Beanland**, Washington & Lee University  
**Mayleen Cortez-Rodriguez**, Cornell University  
**Ashwin Iyengar**, Johns Hopkins University  
**Jennifer Vaccaro**, AMS CASE Fellow 2024  
**Anita Benjamin**, American Mathematical Society

***(146) ILAS Invited Address - Anne Greenbaum, University of Washington***

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**THURSDAY, JANUARY 09 9:40AM–10:45AM Ballroom 6C, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Daniel B. Szyld**, International Linear Algebra Society  
**Daniel B. Szyld**, International Linear Algebra Society

9:40AM *Are Iterative Linear System Solvers Backward Stable?*  
► (146.1) **Anne Greenbaum**<sup>\*</sup>, University of Washington (1203-65-36678)

***(147) PMEJ. Sutherland Frame Lecture - Daniela Witten, University of Washington***

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**THURSDAY, JANUARY 09 9:40AM–10:45AM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Chad Awtrey**, Samford University  
**Chad Awtrey**, Samford University

9:40AM *Selective Inference for Real-World Problems*  
► (147.1) **Daniela Witten**<sup>\*</sup>, University of Washington (1203-62-37867)

***AMS Career Fair***

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**THURSDAY, JANUARY 09 10:00AM–3:00PM Hall 4B, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizers: **Anna Kinzel**, American Mathematical Society  
**Alex Howe**, American Mathematical Society  
**Alex Howe**, American Mathematical Society

***Exhibitor Presentation Theater***

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**THURSDAY, JANUARY 09 10:00AM–5:00PM Hall 4A, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizer: **AMS Meetings Department**, American Mathematical Society

***(148) AMS Contributed Paper Session on Sequences, Approximations, and Harmonic Analysis***

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THURSDAY, JANUARY 09 10:30AM–11:45AM 302, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizer: **Brian D. Boe**, University of Georgia

10:30AM *Stretching Double Sequences by "Blocks"*  
▶ (148.1) **Sami M. Hamid**<sup>\*</sup>, University of North Florida  
(1203-40-44082)

10:45AM *Smooth logistic real and complex, ordinary  
(148.2) and fractional neural network approximations  
over infinite domains*  
**George A. Anastassiou**<sup>\*</sup>, University of  
Memphis (1203-41-36655)

11:00AM *CANCELLED The Schatten classes of  
(148.3) Calderón-Zygmund operators*  
**Francisco Villarroja Alvarez**<sup>\*</sup>, Santa Clara  
University (1203-42-40808)

11:15AM *On the convergence rate of a stable neural  
▶ ♦ Stochastic differential equations with swarm  
(148.4) intelligence*  
**Ywo Josué Bazie**<sup>\*</sup>, Université Joseph KI-ZERBO  
and **Kabore Franck Ter Jumeau**, Université  
Joseph KI-ZERBO (1203-41-43323)

11:30AM *Harmonic Analysis of Quantum Density  
(148.5) Matrices*  
**Carl Andrew Brannen**<sup>\*</sup>, Washington State  
University (1203-42-36634)

***JMM Workshop on Engage, Enhance, Educate:  
Exploring AI-Driven Teaching Strategies and Tools  
for Tomorrow's Math Classrooms***

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THURSDAY, JANUARY 09 10:30AM–12:00PM 4C-2, Level Four,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Jerome Zegaigbe Amedu**, University of New  
Hampshire  
**Kenya Lawrence**, North Carolina State  
University  
**Ruby Ellis**, North Carolina State University

***(149) AIM Alexanderson Award Lecture***

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THURSDAY, JANUARY 09 10:50AM–11:55AM Ballroom 6E,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizers: **Brianna Donaldson**, American Institute of  
Mathematics  
**Michelle Manes**, American Institute of  
Mathematics  
**John Brian Conrey**, American Institute of  
Mathematics

10:50AM *Energy minimization problems in analysis and  
(149.1) discrete geometry*  
**Dmitriy Bilyk**<sup>\*</sup>, University of Minnesota (1203-  
52-45628)

***(150) MAA Lecture on Teaching and Learning -  
Eric Hsu, San Francisco State University***

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THURSDAY, JANUARY 09 10:50AM–11:55AM Ballroom 6C,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizers: **Nancy Ann Neudauer**, Pacific University  
**Christine Ann Kelley**, University of Nebraska-  
Lincoln

10:50AM *Precalculus and calculus: Why do we teach it  
▶ (150.1) and who is allowed to learn it?*  
**Eric Hsu**<sup>\*</sup>, San Francisco State University (1203-  
97-45785)

***PME Panel: What Every Student Should Know  
about the JMM***

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THURSDAY, JANUARY 09 11:00AM–12:00PM 4C-4, Level Four,  
Seattle Convention Center Arch at  
705 Pike

Navigating a large conference can be overwhelming, even  
for those who have previously attended such an event.  
Common questions may include: How do I get the most out  
of the program? What sessions are especially for students?  
What other events should I be on the lookout for? How can  
I get some cool, free math stuff? Students and their faculty  
mentors are encouraged to attend. This panel is sponsored  
by the Pi Mu Epsilon Mathematics Honorary Society.

Moderators: **Stephanie Edwards**, Hope College  
**Stephanie Edwards**, Hope College  
**Shannon R Overbay**, Gonzaga University  
**Jennifer E Beineke**, Western New England  
University  
**Eli S Edwards-Parker**, Hope College  
**Valen Feldmann**, Hope College  
**Yiting Shen**, Hope College  
**Denise Taunton Reid**, Valdosta State  
University

***Spectra Career Workshop***

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THURSDAY, JANUARY 09 11:10AM–12:00PM 400, Level Four,  
Seattle Convention Center Arch at  
705 Pike

Join us at JMM 2025 for a workshop dedicated to exploring  
careers in mathematics for LGBTQ+ people. This session  
will feature stories from LGBTQ+ mathematicians---in  
academia, industry, national labs, and in other settings.  
We'll host a conversation on practical advice for navigating  
the field, and discussions on creating inclusive  
environments. This session will be conversational, hands-  
on, and welcomes people from all backgrounds and in all  
points in their career.

Organizers: **Michael A. Hill**, UCLA  
**Devavrat Dabke**, Level Ventures

***(151) AIM Special Session on Energy Minimization:  
From Analysis to Discrete Geometry (associated  
with the Alexanderson Award Lecture by Dmitriy  
Bilyk)***

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THURSDAY, JANUARY 09 1:00PM–5:00PM 3B, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Dmitriy Bilyk**, University of Minnesota  
**Alexey Glazyrin**, The University of Texas Rio Grande Valley  
**Oleksandr Vlasiuk**, Vanderbilt University  
**Ryan W Matzke**, Technische Universität Graz

- 1:00PM  
▶ (151.1) *Riesz Energy on Convex Polytopes*  
**Ryan W Matzke**, Vanderbilt University (1203-31-44986)
- 1:30PM  
▶ (151.2) *On separation radius for  $s$ -greedy configurations on  $S^d$*   
**Liudmyla Kryvonos**, Vanderbilt University and **Edward Saff**, Vanderbilt University (1203-31-41829)
- 2:00PM  
(151.3) *A discrete interaction system to model nuclear fission*  
**Ihsan Topaloglu**, Virginia Commonwealth University (1203-70-42482)
- 2:30PM  
(151.4) *Bounds for  $L_p$  discrepancy in the Hamming space*  
**Alexander Barg**, University of Maryland and **Madhura Pathegama**, University of Maryland (1203-94-42593)
- 3:00PM  
(151.5) *Limiting behavior of Gaussian and Riesz energies on fractals*  
**Alexander B. Reznikov**, Florida State University and **Jonathan Schillinger**, Florida State University (1203-31-42891)
- 3:30PM  
(151.6) *Gradient flows for sampling and their deterministic interacting particle approximations*  
**Dejan Slepcev**, Carnegie Mellon University, **Anna Korba**, ENSAE/ CREST, **Lihan Wang**, Carnegie Mellon University, **Lantian Xu**, Carnegie Mellon University and **Sangmin Park**, Carnegie Mellon University (1203-35-44229)
- 4:00PM  
(151.7) *Ground states for aggregation-diffusion energies on Riemannian manifolds*  
**Razvan Constantin Fetecau**, Simon Fraser University and **Hansol Park**, Simon Fraser University (1203-58-39124)
- 4:30PM  
▶ (151.8) *Universally optimal configurations for lattice periodic configurations in 2-dimensions*  
**Douglas P Hardin**, Vanderbilt University and **Nathaniel J Tenpas**, Vanderbilt University (1203-52-41265)

***(152) AMS Colloquium Lecture II - Svetlana Jitomirskaya, University of California, Berkeley***

THURSDAY, JANUARY 09 1:00PM–2:05PM Ballroom 6E,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM  
▶ (152.1) *Quantitative global theory, dual Lyapunov exponents, and robust spectral results.*  
**Svetlana Jitomirskaya**, University of California, Berkeley (1203-00-36476)

***AMS Committee on Education Panel Discussion on Mathematics Education for Using and Understanding AI***

THURSDAY, JANUARY 09 1:00PM–2:30PM 4C-3, Level Four,  
Seattle Convention Center Arch at  
705 Pike

TBD

Organizers: **Henry Cohn**, Microsoft Research New England  
**Sara Maloni**, University of Virginia  
**Christine Berkesch**, University of Minnesota  
**Roberto Rubalcaba**, San Diego City College  
**Nairanjana Dasgupta**, Washington State University, Pullman  
**Anna Haensch**, Tufts University  
**Anita Benjamin**, American Mathematical Society

***(153) AMS Contributed Paper Session on Combinatorics, Graph Theory, Order, and General Algebraic Systems, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM 307, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM  
(153.1) *Remarks on zonal labels*  
**John Gordon Gimbel**, University of Alaska (1203-05-37172)
- 1:15PM  
(153.2) *Graph Embeddings & Torus Obstructions*  
**Marie Kramer**, Syracuse University (1203-05-43623)
- 1:30PM  
▶ ♦ (153.3) *Diameter of the  $2 \times n$  Miura-ori origami flip graph*  
**Kacey Yang**, University of California, Los Angeles, **Valentina Pappano**, Rutgers University, New Brunswick, **Emma O'Neil**, Portland State University and **Lumi Christensen**, University of Pennsylvania (1203-05-38276)
- 1:45PM  
▶ (153.4) *Proper diameter of properly connected graphs*  
**Karen B McCready**, King's College (PA) (1203-05-42920)
- 2:00PM  
▶ (153.5) *Tour Lengths in Asymmetric Graphs*  
**Darren A. Narayan**, Rochester Institute of Technology (1203-05-43741)
- 2:15PM  
▶ (153.6) *Failed zero forcing and its variations*  
**Jobby Jacob**, Rochester Institute of Technology (1203-05-42481)
- 2:30PM  
▶ (153.7) *A Pre-Processing Algorithm for Fault Tree Analysis*  
**Libby Taylor**, JHU/APL, **Sophie Rubinfeld**, JHU/APL and **Lily Natasha Wartman**, Rice University (1203-05-44017)
- 2:45PM  
▶ (153.8) *Cognitively Consistent Decision Making via Sentiment Reconstruction and Clusterability Ranking*  
**Lucas J Rusnak**, Texas State University (1203-05-43172)

3:00PM *5-cycles in the Complement of Minimal Prime Graphs*  
 ▶ (153.9) **Ryan Tang\***, Lexington High School, **Micah Dorton**, St. Thomas Aquinas High School, **Ronok Ghosal**, Westwood High School, **Thomas Michael Keller**, Texas State University and **Justin Yu**, Westwood High School (1203-05-39810)

3:15PM *Graphs with Real-Rooted Edge Cover Polynomials*  
 ▶ (153.10) **Feryal Alayont\***, Grand Valley State University and **Can Selek**, Dokuz Eylül University, Türkiye (1203-05-44337)

3:30PM *The Planar Turbidity Number of  $\Theta_6$ -graphs*  
 ▶ (153.11) **Felicia Xingyue Wang**, Duke University, **Diep Ngoc Luong-Le\***, Lehigh University, **Mengyuan Yang**, Swarthmore College and **David Guan**, Bowdoin College (1203-05-40426)

3:45PM *On the connectivity of friends-and-strangers graphs.*  
 ▶ (153.12) **Neil Krishnan\***, The Harker Upper School and **Rupert Li**, Massachusetts Institute of Technology (1203-05-44041)

4:00PM *Spanning structures in incompatibility systems*  
 ◆ (153.13) **Jie Hu\***, Nankai University (1203-05-44198)

4:15PM *On the Girth of Three-Dimensional Algebraically Defined Graphs with Multiplicatively Separable Functions*  
 ▶ (153.14) **Alex Kodess**, Farmingdale State College, **Brian Kronenthal\***, Kutztown University of Pennsylvania and **Tony Wing Hong Wong**, Kutztown University of Pennsylvania (1203-05-42911)

4:30PM *Block eccentricity, a radius bound, and an application to the Randic index*  
 ▶ (153.15) **Margaret I Doig\***, Creighton University (1203-05-43767)

4:45PM *Applications of Cayley Digraphs to Waring's Problem and Sum-Product Formulas*  
 ▶ ◆ (153.16) **Yesim Demiroglu\***, California State University, Sacramento (1203-05-36640)

**(154) AMS Contributed Paper Session on Integral Transforms, Integral Equations, and Calculus of Variations**

THURSDAY, JANUARY 09 1:00PM–3:45PM 308, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

1:00PM *Applications of Complex Sadik Integral Transform*  
 ▶ ◆ (154.1) **Sonia Sharma\***, Department of Mathematics, UIS, Chandigarh University, Mohali, Punjab. and **Prof. Harish Nagar, M. Sc, Ph. D.**, Department of Mathematics, University Institute of Sciences, Chandigarh University, Mohali, Punjab, India (1203-44-41089)

1:15PM *Machine learning image reconstruction for Compton scatter tomography*  
 ▶ (154.2) **Jeffrey Martin\***, Hope College, **Dominic Cugliari**, Hope College, **Sydney Rose Olander**, Hope College and **Karsten G. Wiegerink**, Hope College (1203-44-42342)

1:30PM *Superconvergent approximation method for smooth and weakly singular Fredholm-Hammerstein integral equations*  
 ▶ (154.3) **Shivam Kumar Agrawal\***, Indian Institute of Technology Kharagpur and **Gnaneswar Nelakanti**, Indian Institute of Technology Kharagpur (1203-45-38406)

1:45PM *Convergence analysis of hypersingular integral equations of first kind using spectral projection methods*  
 (154.4) **Saloni Gupta\***, Indian Institute of Technology, Jodhpur (1203-45-42119)

2:00PM *Approximations of non-linear integral equations on unbounded domain*  
 ▶ (154.5) **Ritu Nigam\***, Indian Institute of Technology Kharagpur and **Gnaneswar Nelakanti**, Indian Institute of Technology Kharagpur (1203-45-43313)

2:15PM *Existence of Weak Solutions to the Nonlocal Klausmeier Model*  
 ◆ (154.6) **Cristian Meraz\***, University of Houston and **Gabriela Jaramillo**, University of Houston (1203-45-43855)

2:30PM *Convergence analysis of projection methods for fractional Volterra integro-differential equations*  
 ▶ (154.7) **Ruby Ruby\***, Indian Institute of Technology Jodhpur (1203-45-42125)

2:45PM *On  $\phi$ -best proximity points for weakly suppressive mappings in smooth Banach spaces*  
 ▶ (154.8) **Priyanka Priyadarshini Behera\***, Indian Institute of Technology Kharagpur, Kharagpur-721302, India and **C. Nahak**, Indian Institute of Technology Kharagpur, Kharagpur-721302, India (1203-49-36916)

3:00PM *Necessary and sufficient conditions for the strong invariance property of a sweeping process with a discontinuous perturbation*  
 ◆ (154.9) **Prof. Vinicio Rafael Rios, PhD\***, Louisiana State University (1203-49-44200)

3:15PM *Shape Optimization with Unfitted Finite Element Methods*  
 (154.10) **Jeremy Thomas Shahan\***, Louisiana State University (1203-49-39743)

3:30PM *A Fast and Efficient Method to Solve an Optimal Path Planning Problem on Manifolds*  
 ▶ (154.11) **Edward Duy Huynh\***, University of Arizona and **Christian Parkinson**, University of Arizona (1203-49-42761)

**(155) AMS Contributed Paper Session on Mechanics and Fluid Mechanics**

**THURSDAY, JANUARY 09 1:00PM–5:00PM 306, Level Three,  
Seattle Convention Center Arch at  
705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM  
▶ ◆  
(155.1) *Recursive Algorithm for Computing Configuration Spaces of Rigid Origami*  
**Josiah Moltz**, SUNY Binghamton, **Isaac Ojutomori**, Tufts University and **Clàudia Sallés**, University of South Florida (1203-70-38441)
- 1:15PM  
▶ ◆  
(155.2) *Extending the Applications of Parallel Pleats in Rigid Origami*  
**Josiah Moltz**, SUNY Binghamton, **Isaac Ojutomori**, Tufts University and **Clàudia Sallés**, University of South Florida (1203-70-38443)
- 1:30PM  
(155.3) *A Formula Describing The Motion Of The N-Body Problem Near Total Collision*  
**John G Bryant**, Université Pierre et Marie Curie (1203-70-40274)
- 1:45PM  
▶ (155.4) *Hamiltonian-based neural networks for systems under nonholonomic constraints*  
**Ignacio Puiggros**, The University of British Columbia (1203-70-41941)
- 2:00PM  
▶ (155.5) *Almost Global Asymptotic Trajectory Tracking for Mechanical Systems on Homogeneous Spaces*  
**Jake Welde**, University of Pennsylvania and **Vijay Kumar**, University of Pennsylvania (1203-70-45160)
- 2:15PM  
▶ (155.6) *Solute transport in networks*  
**Dane Johnson**, Worcester Polytechnic Institute and **Sarah Dianne Olson**, Worcester Polytechnic Institute (1203-76-45392)
- 2:30PM  
▶ ◆  
(155.7) *Heat Generation Dynamics in Parallel Flows, A Thermodynamic Insights*  
**Mittu Walia**, Indian Institute of Technology Roorkee and **Karan Ahluwalia**, Amazon (1203-76-40101)
- 2:45PM  
▶ ◆  
(155.8) *Effect of grad-div stabilization on calculating drag and lift coefficients.*  
**Yasasya Batugedara**, The University of Virginia's College at Wise and **Kyle J Schwiebert**, Michigan Technological University (1203-76-45172)
- 3:00PM  
▶ ◆  
(155.9) *Entropy Generation in an Unsteady Reactive Viscous Flow in a Porous Cylindrical Pipe with an Isothermal Wall*  
**Philip Iyiola Farayola**, EMMANUEL ALAYANDE UNIVERSITY OF EDUCATION, OYO. OYO STATE. NIGERIA, **Lateefat Olanike Aselebe**, FEDERAL SCHOOL OF SURVEYING, OYO. OYO STATE. NIGERIA, **Tajudeen Motunrayo Asiru**, EMMANUEL ALAYANDE UNIVERSITY OF EDUCATION, OYO. OYO STATE. NIGERIA, **Kafilat Adebimpe Salaudeen**, EMMANUEL ALAYANDE UNIVERSITY OF EDUCATION, OYO. OYO STATE. NIGERIA and **Saheed Dolapo Ogundiran**, LADOKE AKINTOLA UNIVERSITY OF TECHNOLOGY, OGBOMOSHO. OYO STATE. NIGERIA (1203-76-37663)

- 3:15PM  
(155.10) *Hydrodynamic stability in the presence of stochastic boundary forcing: two case studies in convection and shear flow*  
**Tuan Pham**, Brigham Young University-Hawaii (1203-76-44033)
- 3:30PM  
▶ (155.11) *Transverse stability of particle-laden flow on an inclined plane*  
**Lingyun Ding**, University of California, Los Angeles, Department of Mathematics and **Andrea Bertozzi**, Departments of Mathematics and Mechanical and Aerospace Engineering, University of California, Los Angeles (1203-76-44937)
- 3:45PM  
▶ (155.12) *Parameter Analysis in Continuous Data Assimilation for Various Turbulence Models*  
**Samuel D Little**, Towson University (1203-76-44732)
- 4:00PM  
▶ (155.13) *Advances in Front Tracking Simulations of the Richtmyer-Meshkov Instability*  
**Ryan Holley**, University of Arkansas Department of Mathematical Sciences and **Tulin Kaman**, University of Arkansas Department of Mathematical Sciences (1203-76-42850)
- 4:15PM  
▶ (155.14) *Predicting the trajectories of particles in micro-centrifuge devices*  
**Sarah Cassie Burnett**, UCLA, **Sam Christensen**, UCLA and **Marcus L Roper**, UCLA (1203-76-44885)
- 4:30PM  
▶ (155.15) *Numerical Study of Thermal and Flow Characteristics of Non-Newtonian Ternary Nanofluid*  
**Hani Nami Alahmadi**, Department of Mathematics, College of Science, Jouf University Sakaka, Saudi Arabia and **Tayyab Nawaz**, Department of Mathematics, University of Illinois, Urbana Champaign United States (1203-76-42535)

**(156) AMS Contributed Paper Session on Number Theory and Field Theory, III**

**THURSDAY, JANUARY 09 1:00PM–3:45PM 305, Level Three,  
Seattle Convention Center Arch at  
705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM  
◆ (156.1) *Cranks witnessing an infinite family of congruences for a sum of partition functions.*  
**Jena Gregory**, University of Texas - Rio Grande Valley and **Brandt Kronholm**, University of Texas Rio Grande Valley (1203-11-39128)
- 1:15PM  
▶ ◆  
(156.2) *Congruences for lecture hall partitions.*  
**Haily Citlali Martinez-Aguirre**, University of Texas Rio Grande Valley (1203-11-44922)
- 1:30PM  
(156.3) *Convergent decomposition groups and a "semi-local" Shafarevich Conjecture*  
**Andrew Kwon**, University of Pennsylvania (1203-12-45233)

1:45PM  
(156.4) *Ramification bounds via Wach modules and  $q$ -crystalline cohomology*  
**Pavel Coupek\***, Michigan State University (1203-11-45577)

2:00PM  
▶ ◆ (156.5) *Density of  $r$ -Power Free,  $n$  Relatively Prime Numbers From An Adelic Perspective - Preliminary Report*  
**Colbert Orta\***, California State University, Channel Islands (1203-11-45523)

2:15PM  
▶ (156.6) *Minimal algebra of the fundamental theorem of algebra*  
**Mohsen Aliabadi\***, University of California, San Diego (1203-12-41963)

2:30PM  
▶ (156.7) *Improving Mersenne Prime Detection with Novel Deterministic Algorithms*  
**Manit Gupta\***, DuPont Manual High School (1203-11-41540)

2:45PM  
▶ (156.8) *What Numbers Are in the Store? Multitudes of Rare Concurrences*  
**Mojtaba Moniri\***, Normandale Community College (1203-11-45192)

3:00PM  
▶ (156.9) *On the gcd graphs over polynomial rings and related topics*  
**Tung T. Nguyen\***, Lake Forest College, **Jan Minac\***, Western University and **Duy Tan Nguyen\***, Hanoi University of Science and Technology (1203-11-39663)

3:15PM  
▶ (156.10) *Partition Identities Deriving from  $Sm$ -Dissections of Euler's Product and Various Quintuple Products*  
**James G. Mc Laughlin\***, West Chester University, **Timothy J. Huber\***, University of Texas Rio Grande Valley and **Dongxi Ye\***, Sun Yat-sen University (1203-11-45633)

3:30PM  
◆ (156.11) *A Twisted Variant of Malle's Conjecture*  
**Brandon Alberts\***, Eastern Michigan University, **Amanda Tucker\***, University of Rochester, **Helen G Grundman\***, Bryn Mawr College, **Alexander Slamen\***, University of Toronto and **Shilpi Mandal\***, Emory University (1203-11-41260)

### (157) AMS Special Session on Advances in Numerical Methods for Fluid Dynamics, II

THURSDAY, JANUARY 09 1:00PM–5:00PM 213, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Lucas Bouck\***, UNIVERSITY OF MARYLAND  
**Dr. Rebecca Durst, PhD\***, Brown University

1:00PM  
▶ ◆ (157.1) *A Fourth order iterative method to solve the nonlinear equations*  
**Gurjeet Singh\***, Department of Mathematics, Chandigarh University, gharuan, Mohali, Punjab, India, 140413 (1203-65-43311)

1:30PM  
(157.2) *Stochastic cascade method for a class of differential equations*  
**Tuan Pham\***, Brigham Young University-Hawaii (1203-35-42790)

2:00PM  
▶ (157.3) *Preconditioned Iterative Solvers for the 2D Helmholtz Equation Via Radial Basis Functions*  
**Jia Liu\***, University of West Florida (1203-65-45272)

2:30PM  
▶ (157.4) *Impact of Elastic and Viscoelastic Constraints on the Natural Frequencies of Euler-Bernoulli Beams*  
**Hani Nami Alahmadi\***, Department of Mathematics, College of Science, Jouf University Sakaka, Saudi Arabia (1203-74-42412)

3:00PM  
(157.5) *Finite element analysis of a nematic liquid crystal Landau-de Gennes model with quartic elastic terms*  
**Elafandi Jacob\***, University of California, Berkeley and **Franziska Weber\***, University of California, Berkeley (1203-65-44938)

3:30PM  
▶ (157.6) *Mathematical Modeling of Diffusion-controlled Drug Delivery*  
**Emma Qiu\***, Stephen F Austin High School (1203-65-45759)

4:00PM  
▶ ◆ (157.7) *Validation of LES-C turbulent Models*  
**Yasasya Batugedara\***, The University of Virginia's College at Wise, **Alexander E Labovsky\***, Michigan Technological University and **Kyle J Schwiebert\***, Michigan Technological University (1203-76-45162)

4:30PM  
▶ (157.8) *Accurate numerical solution to wave energy absorption by a flexible wave energy converter in icy environment*  
**Mansi Singh\***, Indian Institute of Technology Kharagpur, India (1203-76-36583)

### (158) AMS Special Session on Advances in Statistical Modeling and Data Analysis, II

THURSDAY, JANUARY 09 1:00PM–5:00PM Yakima 1, Level 1, Seattle Convention Center Arch at 800 Pike

Organizer: **Shusen Pu\***, University of West Florida

1:00PM  
(158.1) *Bayesian Sequential Batch Design in Functional Data*  
**Ping-Han Huang\***, Arizona State University, **Shuang Zhou\***, Arizona State University and **Ming-Hung Kao\***, Arizona State University (1203-62-42033)

1:30PM  
▶ (158.2) *Spatio-Temporal Multilinear Low-Rank Autoregression Models*  
**Rukayya Ibrahim\***, Pennsylvania State University, **Tharindu P. De Alwis\***, University of West Florida and **S. Yaser Samadi\***, Southern Illinois University Carbondale (1203-62-40859)

2:00PM  
▶ (158.3) *Are Mixture Models Valid Priors for Large Sparse Inverse Problems in Imaging?*  
**Alexander Strang\***, The University of California, Berkeley and **Brandon Marks\***, The University of California Berkeley (1203-62-40002)

2:30PM  
▶ (158.4) *Discovering Short-Range Ordering in a Medium Entropy Alloy via Machine Learning Models*  
**Sean Fang\***, Pensacola High School International Baccalaureate Program, **Shan**

**Cecilia Cao**, Be The Change Foundation, California Science And Technology University, **Shusen Pu**, University of West Florida and **Alice Zhang**, Pensacola High School International Bacculaureate (1203-62-45525)

3:00PM (158.5) *Extensions of the CAGE Criterion for Spatial Regionalization*

**Ranadeep Daw\***, University of West Florida, **Christopher K Wikle**, University of Missouri Columbia, **Scott H Holan**, University of Missouri Columbia and **Jonathan R Bradley**, Florida State University (1203-62-40874)

3:30PM (158.6) *Rollout Experiments for Causal Inference under Network Interference*

**Mayleen Cortez-Rodriguez\***, Cornell University, **Matthew Eichhorn**, Cornell University and **Christina Lee Yu**, Cornell University (1203-62-38852)

4:00PM (158.7) *Statistical model selection over partially ordered sets*

**Armeen Taeb\***, University of Washington (1203-06-41723)

4:30PM (158.8) *Statistical Learning of Complex Data Objects*

**Yuan Wang\***, Washington State University (1203-62-42967)

### **(159) AMS Special Session on AI Applications in Health and Medicine**

THURSDAY, JANUARY 09 1:00PM-5:00PM 608, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Chaitra Agrahar**, Altos Labs  
**Robyn Shuttleworth**, Altos Labs

1:00PM (159.1) *CANCELLED Predicting Appendicular Lean Mass, Bone Mineral Density, and Body Fat Percentage using Supervised and Semi-Supervised Learning Algorithms*

**Gyaneshwar Agrahari\***, Louisiana State University, **Kiran Bist**, Louisiana State University, **Alyssa Blount**, LSU, **Nadejda Veselinova Drenska**, Louisiana State University, **Zachary James**, LSU, **Jacob Kapita**, Louisiana State University, **Jackson Knox**, LSU, **Alex P Mensen-Johnson**, LSU, **Monika Pandey**, Louisiana State University, **Giovanni Ohashiegbula**, LSU, **Sunella Ramnath**, LSU, **Nuwanthi Namali Samarawickrama**, Louisiana State University, **Evan Short**, LSU and **Seth Stephens**, LSU (1203-68-38409)

1:30PM (159.2) *Improving DSA Image Segmentation with CNNs*

**Asees Kaur\***, University of California Merced and **Erica Rutter**, University of California, Merced (1203-68-42513)

2:00PM (159.3) *Leveraging Deep-Learning and Unconventional Data for Real-Time Surveillance, Forecasting, and Early Warning of Respiratory Pathogens Outbreak*

**Jude Kong\***, University of Toronto and **Zahra Nia**, Global South Artificial Intelligence for Pandemic and Epidemic Preparedness and

Response Network, York University (1203-68-46168)

2:30PM (159.4) *Image Reconstruction through Polar Coordinate Transformation for Ultrasound Imaging Applications*

**Jocelyn Ornelas-Munoz\***, University of California Merced (1203-68-41322)

3:00PM (159.5) *Using Image Processing for Real-Time Feedback Control of Cell Migration and Classification of Cell Subtypes Under an Electric Field*

**Manasa Kesapragada\***, Department of Bioengineering and Therapeutic Sciences, University of California, San Francisco, 513 Parnassus Avenue, Health Sciences East (HSE), San Francisco, CA 94143, USA, **Yao-Hui Sun**, Department of Ophthalmology & Vision Science, School of Medicine, University of California, Davis, Sacramento, CA, 95817, United States of America, **Giovanny Marquez**, UC Santa Cruz, **Kan Zhu**, Department of Dermatology, University of California, Davis, Sacramento, CA, USA, Department of Ophthalmology & Vision Science, University of California, Davis, Sacramento, CA, USA, **Min Zhao**, Department of Dermatology, School of Medicine, UC Davis, Sacramento, CA 95816, United States of America and **Marcella Gomez**, Department of Applied Mathematics, University of California, Santa Cruz, Santa Cruz, CA, 95060, United States of America (1203-92-41430)

3:30PM (159.6) *Highlighting Limitations of Generative AI in Early-Drug Discovery*

**David Baron\***, Williams College, **Ellen Li**, Imperial College London, **Sophia Pi**, Northwestern University and **Walter Virany**, University of Colorado Boulder (1203-92-39236)

4:00PM (159.7) *Denosing Biomedical Images using Weakly-Supervised and Self-Supervised Deep Learning Methods*

**Reeti Rout\***, Stony Brook University, CSIRE Summer Program, John P. Stevens High School (1203-92-40988)

4:30PM (159.8) *Vector Choquet Integral Guided Ensemble Classifier Feature Fusion based on Fundus and Optical Coherence Tomography Images*

**Pragya Gupta\***, Department of Mathematics, Indian Institute of Technology Kharagpur, **Debjani Chakraborty**, Department of Mathematics, Indian Institute of Technology Kharagpur and **Debashree Guha**, School of Medical Science and Technology, Indian Institute of Technology, Kharagpur, India (1203-92-43571)

### **(160) AMS Special Session on AI Meets Cryptography, III**

THURSDAY, JANUARY 09 1:00PM-5:00PM 612, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Shi Bai**, Florida Atlantic University

**Emily Wenger**, Meta AI  
**Kristin E. Lauter**, Facebook

1:00PM  
▶ (160.1) *Exploring AI-Powered Cryptanalysis of Code-Based Cryptography*  
**Mohamed Malhou**, Meta AI (1203-94-43807)

1:30PM  
▶ (160.2) *Identifying AI Generated Content Using Cryptography and Zero Knowledge Proof Systems*  
**Dan Boneh**, Stanford University (1203-68-38659)

2:30PM *Break*

3:00PM  
▶ ♦ (160.4) *Optimistic Verifiable Training by Controlling Hardware Nondeterminism*  
**Megha Srivastava**, Stanford University (1203-68-44363)

3:30PM  
▶ (160.5) *Neural Network Based Cryptanalysis for Syndrome Decoding*  
**Shraddha Hardikar**, UC Irvine (1203-68-42757)

4:00PM  
▶ ♦ (160.6) *ML Attacks on Learning With Errors with Sparse Small Secrets*  
**Cathy Y. Li**, University of Chicago, Meta (1203-68-43851)

4:30PM  
▶ (160.7) *Practically Solving LPN in High Noise Regimes Faster Using Neural Networks*  
**Haozhe Jiang**, University of California at Berkeley, **Kaiyue Wen**, Stanford University and **Yilei Chen**, Tsinghua University (1203-68-43701)

### ***(161) AMS Special Session on Analysis and Differential Equations at Undergraduate Institutions, II***

**THURSDAY, JANUARY 09 1:00PM–5:00PM 304, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Taryn Cristina Flock**, Macalester College

**Daniel Willem Van Wyk**, Fairfield University

1:00PM  
▶ ♦ (161.1) *The Schrödinger Equation on Graphs and Combinatorial Quantum Field Theory*  
**Ivan Contreras**, Amherst College (1203-81-42794)

1:30PM  
▶ (161.2) *Dynamical systems and the classification of  $C^*$ -algebras*  
**Paul Herstedt**, Macalester College (1203-46-44191)

2:00PM  
♦ (161.3) *Toeplitz operators on variable exponent Bergman spaces*  
**Gerardo R. Chacon**, Gallaudet University (1203-30-41411)

2:30PM  
▶ (161.4) *Fourier Dimension and Badly Approximable Complex Numbers*  
**Kyle Hambrook**, San Jose State University, **Nefi De Moraes**, San Jose State University and **Shaunak Mashalkar**, San Jose State University (1203-42-45279)

3:00PM  
♦ (161.5) *Optimal conditions in Lusin's theorem*  
**Ryan Alvarado**, Amherst College (1203-28-45141)

3:30PM  
▶ (161.6) *What does the condition  $\|f\|_{p'} \geq 0$  mean for  $f$ ?*  
**Robert Kantrowitz**, Hamilton College (1203-00-45792)

4:00PM  
▶ (161.7) *Recovering initial temperature profile of a one-dimensional uniform rod via finite linear time sampling*  
**Young Hwan You**, Indiana University East (1203-35-45529)

4:30PM  
▶ ♦ (161.8) *Extending the Blasius Solution to Nanofluid Boundary Layer Flows*  
**Anil Devarapu**, University of North Georgia and **Zephyrinus C. Okonkwo**, Albany State University (1203-76-44835)

### ***(162) AMS Special Session on Bridging Theory and Practice in Ecological Modeling with Reaction Diffusion Equations, II***

**THURSDAY, JANUARY 09 1:00PM–5:00PM Skagit 4, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **Ratnasingham Shivaji**, University of North Carolina Greensboro

**Jerome Goddard II**, University of North Carolina at Greensboro

1:00PM  
(162.1) *Some recent results on the ideal free distribution in models for the evolution of dispersal.*  
**Chris Cosner**, University of Miami, **Robert Stephen Cantrell**, University of Miami, **King-Yeung Lam**, The Ohio State University and **Ying Zhou**, Lafayette College (1203-92-42001)

2:00PM  
(162.2) *Coupled elliptic equations with mixed couplings*  
**Zhi-Qiang Wang**, Utah State University (1203-35-42749)

2:30PM  
▶ (162.3) *Comparing cues for foraging in dynamic environments via movement, perception and memory*  
**Robert Stephen Cantrell**, University of Miami, **William F Fagan**, University of Maryland, **Chris Cosner**, University of Miami, **Eliezer Gurarie**, SUNY College of Environmental Science and Forestry, **Tyler D Hoffman**, Arizona State University and **Cole Saborio**, University of Maryland (1203-92-42572)

3:00PM  
(162.4) *Effects of harvesting mediated emigration on a landscape ecological model*  
**Gampola Waduge Nalin Fonseka**, University of Central Missouri, **Ratnasingham Shivaji**, University of North Carolina Greensboro, **Jerome Goddard**, Auburn University Montgomery, **J. T. Cronin**, Louisiana State University and **Xiaohuan Xue**, University of North Carolina at Greensboro (1203-35-41988)

3:30PM  
(162.5) *DYNAMICS OF PATCHY VEGETATION PATTERNS IN THE TWO-DIMENSIONAL GENERALIZED KLAUSMEIER MODEL*

**Michael Jeffrey Ward**<sup>\*</sup>, The University of British Columbia (1203-35-45400)

- 4:00PM  
▶ (162.6) *Modeling intraspecific density effects on emigration between two competing species of *Tribolium**  
**J. T. Cronin**, Louisiana State University, **Jerome Goddard II**<sup>\*</sup>, Auburn University at Montgomery, **Aaron Krivchenia**, Louisiana State University and **Ratnasingham Shivaji**, University of North Carolina Greensboro (1203-92-41123)

**(163) AMS Special Session on Conceptual Learning in the Age of AI, I**

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THURSDAY, JANUARY 09 1:00PM–5:00PM 607, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Guannan Hu**, Washburn University

**Lasanthi Gamage**, Webster University

**Qiang Sun Dotzel**, University of Missouri-St. Louis

- 1:00PM  
▶ (163.1) *How Artificial Intelligence Can Dramatically Change Mathematical Teaching and Learning*  
**John Lannin**<sup>\*</sup>, University of Missouri (1203-101-45011)
- 2:00PM  
▶ (163.2) *Taking Advantage of AI to Support Conceptual Learning in an Online Calculus Class*  
**Qiang Sun Dotzel**<sup>\*</sup>, University of Missouri-St. Louis (1203-101-38405)
- 2:30PM  
▶ (163.3) *CANCELLED AI in Mathematics: Uses and Limitations*  
**Guannan Hu**<sup>\*</sup>, Washburn University (1203-101-45559)
- 3:00PM  
▶ ♦ (163.4) *CANCELLED - Engaging with AI: How Student Prompts have the potential to drive Conceptual Learning*  
**Nirmala Naresh**<sup>\*</sup>, University of North Texas and **Zuhail Yilmaz**, North Carolina State University (1203-101-43235)
- 3:30PM  
♦ (163.5) *Using Generative AI in General Mathematics Courses - Story telling and Mathematical writing*  
**Sharmila Sivalingam**<sup>\*</sup>, Maryville University of St. Louis (1203-101-42897)
- 4:00PM  
▶ (163.6) *Me, Myself, and AI: On social-emotional integration of AI in learning experiences for graduate and undergraduate students*  
**Melinda Lanius**<sup>\*</sup>, Auburn University, **Elvan Ceyhan**, Auburn University and **Shawndra Bowers**, Auburn University (1203-101-43438)
- 4:30PM  
▶ (163.7) *Elevating Conceptual Learning Through Computational Thinking and AI tools in the Undergraduate Mathematics Classroom*  
**Sarah Dorothy Castle**<sup>\*</sup>, University of Idaho (1203-97-45302)

**(164) AMS Special Session on Diversity in Mathematical Biology, II**

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THURSDAY, JANUARY 09 1:00PM–5:00PM Skagit 5, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Anna C. Nelson**, Duke University

**Daniel Alejandro Cruz**, University of Florida

- 1:00PM  
▶ ♦ (164.1) *How Identity Can Guide Research: Topology, Biology, and Machine Learning for Cancer Research*  
**Dr. Rowan J Barker-Clarke, PhD**<sup>\*</sup>, Taussig Cancer Institute, Cleveland Clinic, Cleveland, OH, Case Comprehensive Cancer Center, Cleveland, OH and **Andrew Dhawan, M.D., D.Phil.**, Taussig Cancer institute, Cleveland Clinic, Cleveland, OH, School of Medicine, Case Western Reserve University, Cleveland, OH (1203-104-44498)
- 1:30PM  
▶ ♦ (164.2) *Quantifying Endosomal Escape*  
**Fnu Nisha**<sup>\*</sup>, Clemson University and **Keisha Cook**, Clemson University (1203-60-40005)
- 2:00PM  
▶ (164.3) *MRI-informed mathematical model to guide patient-specific optimization triple negative breast cancer response to neoadjuvant chemotherapy*  
**Chengyue Wu**<sup>\*</sup>, University of Texas MD Anderson Cancer Center, **Ernesto A.B.F. Lima**, University of Texas at Austin, **Casey E. Stowers**, University of Texas at Austin, **Zhan Xu**, University of Texas MD Anderson Cancer Center, **Clinton Yam**, University of Texas MD Anderson Cancer Center, **Jong Bum Son**, University of Texas MD Anderson Cancer Center, **Jingfei Ma**, University of Texas MD Anderson Cancer Center, **Gaiane M. Rauch**, University of Texas MD Anderson Cancer Center and **Thomas E. Yankeelov**, University of Texas MD Anderson Cancer Center, University of Texas at Austin (1203-92-41300)
- 2:30PM  
▶ (164.4) *Overcoming cell cycle inhibitors and endocrine therapy (CCI+ET) resistance in ER+ breast cancer by restoring immune surveillance and tumor control*  
**Jiyeon Park**<sup>\*</sup>, University of Utah, **Frederick R Adler**, University of Utah, **Jason Griffiths**, City of Hope, **Aritro Nath**, City of Hope, **Patrick Cosgrove**, City of Hope and **Kimya Karimi**, City of Hope (1203-92-44586)
- 3:00PM  
▶ (164.5) *Neoantigen evolution and response to checkpoint inhibitor immunotherapy in colorectal cancer*  
**Alanna Sholokhova**<sup>\*</sup>, University of Washington (1203-92-42410)
- 3:30PM  
▶ ♦ (164.6) *Understanding Neutrophil Dynamics during COVID-19 Infection*  
**Quiyana M. Murphy**<sup>\*</sup>, Virginia Tech, Virginia Tech Center for the Mathematics of Biosystems and **Stanca Ciupe**, Virginia Tech (1203-92-41627)
- 4:00PM  
▶ (164.7) *Modeling the Dynamics of Environmentally Transmitted Diseases*  
**Christina Edholm**<sup>\*</sup>, Scripps College (1203-92-44531)

4:30PM  
▶ ◆  
(164.8) *Foot and mouth disease and the immune system of African Buffalo (*Syncerus caffer*): How does a fast-spreading disease persist in the wild*  
**Ricardo Noe Gerardo Reyes Grimaldo**<sup>\*</sup>, Lane Community College, Oregon State University, **Anna Jolles**, Oregon State University, **Jan Medlock**, Oregon State University and **Brianna Beechler**, Oregon State University (1203-92-43308)

***(165) AMS Special Session on Dynamics of Continued Fractions and Related Systems, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM 310, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Joseph Andrew Vandehey**, University of Texas at Tyler  
**Anton Lukyanenko**, George Mason University, Fairfax

- 1:00PM  
(165.1) *Continued fractions over non-Euclidean rings*  
**Daniel Everett Martin**<sup>\*</sup>, Clemson University (1203-11-42542)
- 1:30PM  
(165.2) *Vector memory random walks and dynamics of simplicial systems*  
**Charles Fougeron**<sup>\*</sup>, Université Sorbonne Paris Nord (1203-37-43310)
- 2:00PM  
▶ (165.3) *Multi-dimensional continued fractions and Integer Partitions*  
**Thomas Garrity**<sup>\*</sup>, Williams (1203-11-42890)
- 2:30PM  
(165.4) *Warped continued fractions*  
**Slade Sanderson**<sup>\*</sup>, Utrecht University (1203-11-41858)
- 3:00PM  
(165.5) *Continuity of entropy for  $\alpha$ -deformations of an infinite class of continued fraction maps*  
**Thomas A. Schmidt**<sup>\*</sup>, Oregon State University, **Kariane Calta**, Vassar College and **Cor Kraaikamp**, Technische Universiteit Delft and Thomas Stieltjes Institute of Mathematics; Delft, the Netherlands (1203-37-41458)
- 3:30PM  
▶ (165.6) *Regular, Semi-Regular, and Proper Continued Fractions*  
**David Ralston**<sup>\*</sup>, SUNY Old Westbury (1203-37-42344)
- 4:00PM  
▶ (165.7)  *$p$ -adic numbers, adeles, and shrinking target problems*  
**Akshat Das**<sup>\*</sup>, US Military Academy, West Point (1203-37-42395)
- 4:30PM  
▶ (165.8) *Spacetime continued fractions*  
**Brandon G. Barreto-Rosa**, George Mason University, **Jean-Philippe Burelle**, Université de Sherbrooke, **Martha Hartt**, Temple College and **Anton Lukyanenko**<sup>\*</sup>, George Mason University, Fairfax (1203-11-43883)

***(166) AMS Special Session on Geometric and Combinatorial Methods in Deep Learning Theory, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM 613, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Julia Elisenda Grigsby**, Boston College  
**Rishi Sonthalia**, UCLA  
**Kathryn Anne Lindsey**, Boston College

- 1:00PM  
▶ ◆  
(166.1) *Neural Approaches for Geometric Problems*  
**Yusu Wang**<sup>\*</sup>, University of California - San Diego (1203-68-44359)
- 2:00PM  
▶ (166.2) *The star geometry of regularizer learning*  
**Eliza O'Reilly**<sup>\*</sup>, Johns Hopkins University, **Oscar Leong**, UCLA and **Yong Sheng Soh**, National University of Singapore (1203-49-42849)
- 2:30PM  
(166.3) *Covering Numbers of Real Algebraic Varieties and Applications to Data Science*  
**Joe Kileel**<sup>\*</sup>, University of Texas at Austin (1203-14-38136)
- 3:00PM  
(166.4) *Comparing Graph Transformers via Positional Encodings*  
**Mitchell Black**, University of California San Diego, **Zhengchao Wan**, University of Missouri, **Gal Mishne**<sup>\*</sup>, University of California San Diego, **Amir Nayyeri**, Oregon State University and **Yusu Wang**, University of California San Diego (1203-68-43910)
- 3:30PM  
▶ ◆  
(166.5) *Beyond Euclid : An Illustrated Guide to Modern Machine Learning with Geometric, Topological, and Algebraic Structures*  
**Sophia Sanborn**, Stanford, **Johan Mathe**, Atmo Inc, **Mathilde Papillon**<sup>\*</sup>, University of California Santa Barbara, **Domas Buracas**, New Theory AI, **Hansen Lillemark**, New Theory AI, **Christian Shewmake**, New Theory AI, **Abby Bertics**, University of California Santa Barbara, **Xavier Pennec**, Université Côte d'Azur and Inria and **Nina Miolane**, UC Santa Barbara (1203-51-39402)
- 4:00PM  
◆ (166.6) *Noise level as a dimension -- spectral embeddings vs. generative models*  
**Octavian Vlad Murad**, University of Washington, **Alex Kokot**, University of Washington and **Marina Meila**<sup>\*</sup>, University of Washington (1203-53-42316)

***(167) AMS Special Session on Graphs, Hypergraphs, and Extremal Combinatorics, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM Tahoma 4, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Calum Buchanan**, University of Vermont  
**Kimberly P. Hadaway**, Iowa State University  
**Van Magnan**, University of Montana  
**Cory Palmer**, University of Montana

- 1:00PM  
▶ ◆  
(167.1) *A colored subgraph density problem*  
**Emily Cairncross**<sup>\*</sup>, University of Illinois Chicago and **Dhruv Mubayi**, University of Illinois Chicago (1203-05-40806)

1:30PM  
(167.2) *Integer and fractional covers of the  $t$ -cliques of a graph*  
**Jozsef Balogh**, University of Illinois at Urbana-Champaign, **Jialin He**, The Hong Kong University of Science and Technology, **Robert A. Krueger**, University of Illinois at Urbana-Champaign, **The Nguyen**, University of Illinois at Urbana-Champaign and **Michael C. Wigal**, University of Illinois at Urbana-Champaign (1203-05-41426)

2:00PM  
▶ (167.3) *Three Term Arithmetic Progressions in Euclidean Ramsey theory*  
**Gabriel Currier**, University of British Columbia, **Kenneth Jacob Moore**, University of British Columbia and **Chi Hoi Yip**, Georgia Tech (1203-05-42002)

2:30PM  
▶ (167.4) *Colorings avoiding linear patterns in Euclidean Ramsey theory*  
**Gabriel Currier**, University of British Columbia, **Kenneth Jacob Moore**, University of British Columbia and **Chi Hoi Yip**, Georgia Tech (1203-52-42674)

3:00PM  
▶ ♦ (167.5) *Sums, Differences and Dilates*  
**Jonathan Cutler**, Montclair State University, **Luke Pebody**, Jane Street and **Amites Sarkar**, Western Washington University (1203-05-45053)

3:30PM  
▶ ♦ (167.6)  *$\mathbb{Z}$ -Unique Edge Coloring*  
**Vic Bednar**, Furman University and **Neal Bushaw**, Virginia Commonwealth University (1203-05-44755)

4:00PM  
▶ (167.7) *Exact Saturation and Semi-Saturation Numbers for  $\mathbb{Z}$ -Uniform Bow Ties- $\mathbb{H}_4(7,2)$*   
**Nika Salia**, King Fahd University of Petroleum and Minerals and **Stijn Cambie**, Institute for Basic Science (1203-05-39852)

4:30PM  
▶ (167.8) *Hamiltonicity and related properties in  $\mathbb{Z}_{r+1}$ -free graphs*  
**Aleyah Dawkins**, Carnegie Mellon University and **Rachel Kirsch**, George Mason University (1203-05-45557)

**(168) AMS Special Session on Heegaard Splittings of 3-manifolds and Trisections of 4-manifolds, II**

THURSDAY, JANUARY 09 1:00PM–5:00PM 620, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Alexander Zupan**, University of Nebraska-Lincoln  
**Jeffrey Meier**, Western Washington University  
**Jeffrey Meier**, Western Washington University

1:00PM  
(168.1) *Branched covers of 2-knots and  $\mathbb{C}P^2$*   
**Mark Hughes**, Brigham Young University, **Maggie Miller**, University of Texas at Austin and **Seungwon Kim**, Sungkyunkwan University (1203-57-42631)

1:30PM  
▶ (168.2) *Combinatorial diagrams for Lagrangians in  $\mathbb{C}P^2$*

**Sarah Blackwell**, University of Virginia and **Aaron Mathis**, University of Memphis (1203-57-40835)

2:00PM  
(168.3) *Heegaard diagrams for  $\mathbb{S}^3$ -manifolds*  
**Geunyoung Kim**, McMaster University (1203-57-42493)

2:30PM  
♦ (168.4) *Knotted surface invariants via branched covers*  
**Sarah Blackwell**, University of Virginia, **Patricia Cahn**, Smith College, **Gordana Matic**, University of Georgia and **Terrin Warren**, California Polytechnic State University (1203-57-40462)

3:00PM  
▶ (168.5) *Graphs from bridge multisections*  
**Roman Aranda**, University of Nebraska - Lincoln and **Carolyn Engelhardt**, University at Buffalo (1203-57-44264)

3:30PM  
(168.6) *Equivariant Trisections for Finite Group Actions on 4-Manifolds -- Tools and Examples*  
**Evan Scott**, CUNY Graduate Center and **Jeffrey Meier**, Western Washington University (1203-57-43781)

4:00PM  
(168.7) *Smoothing pseudo-isotopies*  
**Dr. Patrick Orson, PhD**, California Polytechnic State University, **Mark Powell**, University of Glasgow and **Oscar Randal-Williams**, University of Cambridge (1203-57-43932)

4:30PM  
(168.8) *Exotic definite 4-manifolds with non-cyclic fundamental group*  
**Patrick Naylor**, McMaster University (1203-57-43449)

**(169) AMS Special Session on Homological Interactions Between Commutative and Noncommutative Algebra, II**

THURSDAY, JANUARY 09 1:00PM–5:00PM 602, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Luigi Ferraro**, Texas Tech University  
**Souvik Dey**, Charles University, Prague

1:00PM  
▶ (169.1) *Examples of invariants of AS regular algebras under non-semisimple Hopf actions*  
**Ellen E Kirkman**, Wake Forest University and **Ruiqi Lin**, Indiana University (1203-16-42935)

1:30PM  
(169.2) *Inner-faithful actions of Drinfeld doubles of finite groups on Artin-Schelter regular algebras*  
**Tolulope Oke**, Wake Forest University, **Ellen E Kirkman**, Wake Forest University and **W. Frank Moore**, Wake Forest University (1203-16-42989)

2:00PM  
(169.3) *Actions of Pansera's Hopf Algebras on Cubic AS-regular Algebras*  
**W Frank Moore**, Wake Forest University and **Jaxon Wheeler**, Wake Forest University (1203-16-44397)

2:30PM  
(169.4) *Computing sheaf cohomology over noncommutative projective schemes*  
**Michael K. Brown**, Auburn University, **Daniel Erman**, University of Hawai'i and **Gregory G. Smith**, Queen's University (1203-18-42394)

3:00PM (169.5) *On the Vanishing of Tor and Depth of Tensor Products*  
**Justin Lyle**<sup>\*</sup>, Auburn University and **Andrew Soto Levins**, Texas Tech University (1203-13-43269)

3:30PM (169.6) *Homological conditions on locally gentle algebras*  
**Sarafina Ford**<sup>\*</sup>, University of Washington, **Amrei Oswald**, University of Washington and **James Jian Zhang**, University of Washington (1203-16-42448)

4:00PM (169.7) *Resolving the Module of Derivations on an  $n$  times  $(n+1)$  Determinantal Ring*  
**Henry Potts-Rubin**<sup>\*</sup>, Syracuse University (1203-13-41776)

4:30PM (169.8) *Hochschild cohomology of monomial path algebras*  
**Amrei Oswald**<sup>\*</sup>, University of Washington, **Dalia Arntstein**, Universidad de la República de Uruguay, **Janina C. Letz**, Bielefeld University and **Andrea Solotar**, Universidad de Buenos Aires (1203-16-44666)

***(170) AMS Special Session on Machine Learning to Accelerate Mathematical Discovery, II***

**THURSDAY, JANUARY 09 1:00PM–5:00PM Skagit 2, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **Henry Kvinge**, Pacific Northwest National Laboratory  
**Herman Chau**, University of Washington  
**Davis Richard Brown**, Pacific Northwest National Laboratory  
**Sara C. Billey**, University of Washington  
**Helen Jenne**, Pacific Northwest National Laboratory

1:00PM (170.1) *What kind of machine learning is good for what kind of mathematics?*  
**Jordan S Ellenberg**<sup>\*</sup>, University of Wisconsin-Madison (1203-68-42072)

1:30PM (170.2) *Big data-driven insights into knot invariants*  
**Radmila Sazdanovic**<sup>\*</sup>, NC State University, **Pawel Dlotko**, DIOSCURI Centre in Topological Analysis and **Davide Gurnari**, DIOSCURI Centre in Topological Analysis (1203-55-41170)

2:00PM (170.3) *Data-scientific study of Kronecker coefficients*  
**Kyu-Hwan Lee**<sup>\*</sup>, University of Connecticut (1203-20-42859)

2:30PM (170.4) *Artificially Intelligence and Machine Learning Conjecturing with TxGraffiti*  
**Randy Davila**<sup>\*</sup>, RelationalAI (1203-103-39716)

3:00PM *Break*

3:30PM (170.6) *What can `mathlib` tell us about mathematics?*  
**Adam Topaz**<sup>\*</sup>, University of Alberta (1203-68-44608)

4:00PM (170.7) *Community and Mentorship Through the Experimental Lean Lab*  
**Jarod Alper**<sup>\*</sup>, University of Washington, **Herman Chau**, University of Washington and **Vasily Ilin**, University of Washington (1203-101-44733)

***(171) AMS Special Session on Modular Forms, Hypergeometric Functions, and Related Topics, II***

**THURSDAY, JANUARY 09 1:00PM–5:00PM 604, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Michael Allen**, Oregon State University  
**Kalani Thalagoda**, Tulane University  
**Holly Swisher**, Oregon State University  
**Fang-Ting Tu**, Louisiana State University

1:00PM (171.1) *Modular forms, hypergeometric motives, and rigid surfaces of geometric genus 2*  
**Asher Auel**, Dartmouth College, **Adam Logan**, Tutte Institute for Mathematics and Computation, Carleton University and **John M. Voight**<sup>\*</sup>, Dartmouth College, University of Sydney (1203-11-41051)

1:30PM (171.2) *Hypergeometric differential equations and invertible  $K3$  surface pencils*  
**Ursula Whitcher**<sup>\*</sup>, Mathematical Reviews (AMS) and **Adriana Salerno**, National Science Foundation (1203-14-41111)

2:00PM (171.3) *Finite field hypergeometric functions and arithmetic of invertible  $K3$  surface pencils*  
**Adriana Salerno**<sup>\*</sup>, National Science Foundation and **Ursula Whitcher**, Mathematical Reviews (AMS) (1203-11-41114)

2:30PM (171.4) *Elliptic curves with potentially good supersingular reduction and coefficients of the classical modular polynomials*  
**Haiyang Wang**<sup>\*</sup>, University of Minnesota Duluth (1203-11-42590)

3:00PM (171.5) *Inversion Formulas for the Modular  $sj$ -function*  
**Alejandro De Las Penas Castano**<sup>\*</sup>, University of Virginia and **Badri Vishal Pandey**, Universitat zu Koln (1203-33-43526)

3:30PM (171.6) *Transcendence of  ${}_3F_2(1)$  Hypergeometric Series and  $L$ -values of Modular Forms*  
**Esme Rosen**<sup>\*</sup>, Louisiana State University (1203-11-41239)

4:00PM (171.7) *The Explicit Hypergeometric Modularity Method*  
**Brian Grove**<sup>\*</sup>, Louisiana State University, **Michael Allen**, Louisiana State University, **Ling Long**, Louisiana State University and **Fang-Ting Tu**, Louisiana State University (1203-11-41888)

4:30PM (171.8) *The arithmetic of hypergeometric Galois representations in low dimensions*  
**Wen-Ching Winnie Li**, Pennsylvania State University, **Tong Liu**, Purdue University and **Ling Long**<sup>\*</sup>, Louisiana State University (1203-11-40724)

**(172) AMS Special Session on New Faces in Operator Theory, II**

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THURSDAY, JANUARY 09 1:00PM–5:00PM 201, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Michael R Pilla**, Florida Polytechnic University  
**William Thomas Ross**, University of Richmond

- 1:00PM (172.1) *A Constructive Proof of a Noncommutative Fej\{e}r-Riesz Theorem*  
**Palak Arora**<sup>\*</sup>, Williams College (1203-47-42888)
- 1:30PM (172.2) *Numerical Index*  
▶ ◆ **Fnu Monika**<sup>\*</sup>, Hampton University (1203-46-45560)
- 2:00PM (172.3) *On the Spectral Density of Radially-Compressed Toeplitz Operators*  
**Trevor Camper**<sup>\*</sup>, Clemson University (1203-47-42449)
- 2:30PM (172.4) *Multiplier Weak-Type Inequalities for the Maximal Operator*  
◆ **Brandon Sweeting**<sup>\*</sup>, Washington University in St. Louis (1203-42-41890)
- 3:00PM (172.5) *Existence of Extremal Subspaces for some restricted  $n$ -width problems in Hilbert spaces*  
**Christopher Felder**<sup>\*</sup>, Indiana University Bloomington and **Pierre-Olivier Parisé**, Université du Québec à Trois-Rivières (1203-41-40895)
- 3:30PM (172.6) *Szeg\{H}o-type limit theorems in the Drury Arveson space.*  
◆ **Arya Gayathri Memana**<sup>\*</sup>, University of Florida (1203-46-42993)
- 4:00PM (172.7) *The Ces\{a}ro operator on Local Dirichlet Spaces*  
**William Verreault**<sup>\*</sup>, University of Toronto, **Eugenio Dellepiane**, Università degli studi di Milano, **Javad Mashreghi**, Laval University and **Mostafa Nasri**, University of Winnipeg (1203-47-39431)
- 4:30PM (172.8) *Determinants of Random Unitary Pencils*  
**George Roman**<sup>\*</sup>, University of Florida and **Michael T. Jury**, University of Florida (1203-15-40092)

**(173) AMS Special Session on Non-smooth Analysis and Geometry, II**

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THURSDAY, JANUARY 09 1:00PM–5:00PM 210, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Guy C. David**, Ball State University  
**Vyron Vellis**, University of Tennessee, Knoxville

- 1:00PM *Break*
- 1:30PM (173.2) *A Bourgain-Brezis-Mironescu -characterization for differential forms.*

**Ilmari Kangasniemi**<sup>\*</sup>, University of Cincinnati (1203-46-39193)

- 2:00PM (173.3) *Umbel Convexity of Metric Spaces*  
**Chris Gartland**<sup>\*</sup>, University of California San Diego (1203-51-42677)
- 2:30PM (173.4) *Metric cubes with variable scaling and applications*  
**Matthew Badger**<sup>\*</sup>, University of Connecticut (1203-28-38932)
- 3:00PM (173.5) *Asymptotics of maximum distance minimizers*  
▶ **Lisa Naples**<sup>\*</sup>, Fairfield University, Fairfield CT USA (1203-49-39628)
- 3:30PM (173.6) *Randomly generated  $H^1$ -older curves with wild tangent spaces*  
◆ **Eve Shaw**<sup>\*</sup>, University of Tennessee and **Vyron Vellis**, University of Tennessee (1203-28-40557)
- 4:00PM (173.7) *Energy-Minimal Homeomorphisms between Embedded Tori*  
**Adam Krause**<sup>\*</sup>, Syracuse University (1203-30-43688)
- 4:30PM (173.8) *A step towards the tensorization of Sobolev spaces*  
**Silvia Ghinassi**<sup>\*</sup>, University of Washington, **Vikram Giri**, ETH and **Elisa Negrini**, UCLA (1203-46-44871)

**(174) AMS Special Session on Random Walks on Graphs and Related Parameters, II**

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THURSDAY, JANUARY 09 1:00PM–5:00PM Tahoma 3, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Jane Breen**, Ontario Tech University  
**Sooyeong Kim**, York University  
**Mark Kempton**, Brigham Young University

- 1:00PM (174.1) *Gluing via block similarity matrices for distance matrices*  
▶ **Steve Butler**<sup>\*</sup>, Iowa State University (1203-05-43211)
- 1:30PM (174.2) *Spectral gaps of normalized distance Laplacian matrices*  
**Michael Tait**<sup>\*</sup>, Villanova University (1203-05-41600)
- 2:00PM (174.3) *A lower bound on the smallest eigenvalue of a graph and an application to the associahedron graph*  
▶ **Vishal Gupta**<sup>\*</sup>, University of Delaware (1203-05-42696)
- 2:30PM *Break*
- 3:00PM (174.5) *Random walk betweenness for directed networks*  
▶ **Jane Breen**<sup>\*</sup>, Ontario Tech University (1203-05-45396)
- 3:30PM (174.6) *HEdge Against Cyber Attacks with HEdge2Vec*  
▶ **Alyson Bittner**<sup>\*</sup>, Pacific Northwest National Laboratory (1203-05-41639)

4:00PM *Curvature and strongly regular graphs*  
(174.7) **Paul Horn**, University of Denver and **Alex Stevens**, Alex Stevens (1203-05-44242)

**(175) AMS Special Session on Recent Advancements in Integrable Systems and Orthogonal Polynomials, II**

THURSDAY, JANUARY 09 1:00PM–5:00PM 303, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Tom Trogdon**, University of Washington  
**Deniz Bilman**, University of Cincinnati  
**Cade Ballew**, University of Washington

1:00PM *Numerical solutions of Riemann--Hilbert problems on disjoint intervals*  
(175.1) **Cade Ballew**, University of Washington and **Thomas D. Trogdon**, University of Washington (1203-65-43959)

1:30PM *Asymptotic Behavior of Rational Painleve-V Functions*  
(175.2) **Robert J Buckingham**, University of Cincinnati (1203-34-45297)

2:00PM *Asymptotics and Properties of Zeros of Multiple Orthogonal Polynomials*  
▶ (175.3) **Rafael Morales**, Baylor University (1203-12-45419)

2:30PM *Asymptotics and Zeros of a special family of Jacobi Polynomials*  
▶ (175.4) **John Jairo Jairo Lopez Santander**, Tulane University (1203-41-44599)

3:00PM *Orthogonal polynomials and the six-vertex model*  
(175.5) **Karl E. Liechty**, DePaul University (1203-82-44996)

3:30PM *Multipoint distribution of the KPZ fixed point*  
(175.6) **Yuchen Liao**, University of Wisconsin, Madison and **Zhipeng Liu**, University of Kansas (1203-60-44185)

4:00PM *Non-Hermitian orthogonality in the  $sq^t$  tiling model*  
(175.7) **Ahmad Barhoumi**, KTH Royal Institute of Technology and **Maurice Duits**, KTH Royal Institute of Technology (1203-82-42819)

4:30PM *Bordered and Framed Toeplitz and Hankel Determinants*  
(175.8) **Roosbeh Gharakhloo**, University of California Santa Cruz and **Karl E. Liechty**, DePaul University (1203-30-42381)

**(176) AMS Special Session on Research Results by Mathematicians from the Enhancing Diversity in Graduate Education (EDGE) Program, II**

THURSDAY, JANUARY 09 1:00PM–5:00PM Skagit 3, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Sofia Rose Martinez Alberga**, Purdue University  
**Kelly Buch**, University of Tennessee Knoxville

**Alexis Hardesty**, Texas Woman's University  
**Quiyana M. Murphy**, Virginia Tech

1:00PM *How complicated is the proper homotopy equivalence relation of graphs?*  
▶ (176.1) **Hannah Hoganson**, University of Maryland and **Jenna Zombak**, University of Maryland, College Park (1203-54-38572)

1:30PM *Examining the Unintended Consequences of Disruptions to the Illicit Drug Market*  
▶ ◆ (176.2) **Laura Odylis Mora**, North Carolina State University, **Maria Mayorga**, North Carolina State University, **Osman Ozaltin**, North Carolina State University, **Philip Lee**, RTI International, **Amang Sukasih**, RTI International, **Lance Couzens**, RTI International, **Bradley Ray**, RTI International and **Nick Richardson**, RTI International (1203-62-38795)

2:00PM *Exploiting Additional Measurements in Staggered Rollout Designs for Graph Agnostic Estimators under Network Interference*  
▶ ◆ (176.3) **Emily Lopez**, University of Minnesota - Twin Cities, **Mayleen Cortez-Rodriguez**, Cornell University, **Matthew Eichhorn**, Cornell University and **Christina Lee Yu**, Cornell University (1203-62-40810)

2:30PM *Inner Product Free Krylov Methods for Large-Scale Inverse Problems*  
▶ ◆ (176.4) **Ariana Brown**, Emory University, **Julianne Chung**, Emory University, **James Nagy**, Emory University and **Malena Sabaté Landman**, Department of Mathematics, Emory University (1203-65-43507)

3:00PM *Investigating STEM A Retention Program Participant's Sense of Belonging in Mathematics*  
▶ ◆ (176.5) **Skylyn Irby**, The University of Alabama (1203-97-44135)

3:30PM *Data-driven modeling and prediction of microglial cell dynamics in the ischemic penumbra*  
▶ ◆ (176.6) **Sara Rose Johnson**, University of Puget Sound, Worcester Polytechnic Institute and **Andrea Arnold**, Worcester Polytechnic Institute (1203-92-45037)

4:00PM *An Automorphic Hamiltonian*  
◆ (176.7) **Marcella Manivel**, University of Minnesota (1203-11-38569)

4:30PM *Almost Periodicity and Pure Point Diffraction*  
◆ (176.8) **Nyah Davis**, Rice University (1203-43-44859)

**(177) AMS Special Session on Solutions of Probability or Applied Random Process Problems Using Linear Algebraic or Combinatorial Methods, II**

THURSDAY, JANUARY 09 1:00PM–5:00PM Yakima 2, Level 1, Seattle Convention Center Arch at 800 Pike

Organizers: **Randall J. Swift**, California State Polytechnic University, Pomona

**Alan Krinik**, California State Polytechnic University, Pomona

1:00PM  
▶ (177.1) *Random walks, queues and modified Bessel functions*

**Barbara Haas Margolius**<sup>\*</sup>, Cleveland State University (1203-60-39317)

1:30PM  
▶ (177.2) *Explicit Transient Probabilities of Markov Chains Having Mainly Transition Step Sizes of 0 or  $\pm 1$*

**Theodore De Santos**<sup>\*</sup>, California State Polytechnic University, Pomona, **Alan Krinik**, California State Polytechnic University, Pomona and **Hubertus Von Bremen**, California State Polytechnic University, Pomona (1203-60-43316)

2:00PM  
▶ (177.3) *Overview and recent results for multivariate matrix exponential distributions*

**Bo Friis Nielsen**<sup>\*</sup>, Professor (1203-60-41733)

3:00PM  
▶ (177.4) *Explicit formulas for powers and the exponential of some banded matrices*

**Hubertus von Bremen**, California State Polytechnic University, Pomona and **Alan Krinik**<sup>\*</sup>, California State Polytechnic University, Pomona (1203-60-43304)

3:30PM  
(177.5) *Calculating the Stationary Distribution of a Markov Chain by Decomposing its Set of Global Balance Equations*

**David Pittman**<sup>\*</sup>, Clemson University and **Brian Fralix**, Clemson University (1203-60-41800)

4:00PM  
▶ (177.6) *Duality Theory to Calculate Infinite-state Absorption Probabilities*

**Heba Ayeda**<sup>\*</sup>, California State Polytechnic University, Pomona, **David Beecher**, California State Polytechnic University, Pomona, **Alan Krinik**, California State Polytechnic University, Pomona, **Sean Kanne**, California State Polytechnic University, Pomona and **Sergio Valentin Navia**, California State Polytechnic University, Pomona (1203-60-44306)

4:30PM  
▶ (177.7) *Connecting irreducible and absorbing Markov chains with applications*

**Gerardo Rubino**<sup>\*</sup>, INRIA, France (1203-60-41273)

**(178) AMS Special Session on Systemic Change Within and Between K-12 and Post-Secondary Mathematics Education: Improvement for Smooth Transitions and Increased Persistence in Mathematics for All Students, II**

THURSDAY, JANUARY 09 1:00PM–5:00PM Chelan 2, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Josh Recio**, Charles A. Dana Center, The University of Texas at Austin  
**Katherine Leigh Arrington**, Charles A. Dana Center, The University of Texas at Austin

1:00PM  
▶ (178.1) *Implications of Mathematics Pathways on K-12 Education*

**Josh Recio**<sup>\*</sup>, Charles A. Dana Center, The University of Texas at Austin (1203-97-41603)

2:00PM  
▶ (178.2) *Where Policy Meets Practice: Addressing Barriers to Expanding Math Pathways*

**Pamela Burdman**<sup>\*</sup>, Just Equations (1203-97-39749)

3:00PM  
▶ (178.3) *Shifting Paradigms in College Education: The Measurable Impact of Math Pathway Corequisites, Holistic Support, and Student-Centered Learning in Mathematics*

**Tammi Perez-Rice**<sup>\*</sup>, University of Texas-Charles A. Dana Center (1203-101-41614)

4:00PM  
▶ (178.4) *Cross-sector collaboration to promote aligned mathematics pathways in high school and postsecondary education*

**Joan Zoellner**<sup>\*</sup>, Dana Center, **Mason Campbell**, Arkansas Division of Higher Education, **Arlene Crum**, Washington Office of Superintendent of Public Instruction, **Steve Hood**, Utah System of Higher Education and **Danen Jobe**, Colorado Community College System (1203-97-41620)

**(179) AMS Special Session on the Open Neighborhood of Applied Topology, II**

THURSDAY, JANUARY 09 1:00PM–5:00PM 614, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Henry Hugh Adams**, Colorado State University  
**Evgeniya Lagoda**, Freie Universität Berlin

1:00PM  
▶ (179.1) *Good Gradients and How To Find Them: Towards Multi-Scale Representation Learning*

**Bastian Rieck**<sup>\*</sup>, University of Fribourg (1203-62-40280)

1:30PM  
▶ (179.2) *A dynamic look at persistent homology: the depth poset of a filtered Lefschetz complex*

**Michal Lipinski**<sup>\*</sup>, Institute of Science and Technology Austria (ISTA) (1203-55-40757)

2:00PM  
◆ (179.3) *2-Parameter Persistent Homology of the Second Configuration Spaces of Trees*

**Wenwen Li**<sup>\*</sup>, St. Mary's College of Maryland and **Murad Ozaydin**, University of Oklahoma (1203-55-42452)

2:30PM  
▶ (179.4) *Stability of Spatiotemporal Euler Characteristic Surfaces for Time Series Data*

**Atish J. Mitra**<sup>\*</sup>, Montana Tech (1203-55-38258)

3:00PM  
(179.5) *Matroid colorings of KKM covers*

**Daniel A McGinnis**<sup>\*</sup>, Princeton University (1203-52-40346)

3:30PM  
(179.6) *Christoffel polynomials for Topological Data Analysis*

**Pepijn Roos Hoefgeest**<sup>\*</sup>, KTH Stockholm (1203-14-41902)

4:00PM  
▶ (179.7) *Spaces of discrete Morse functions, merge trees, and barcodes*

**Julian Brüggemann**<sup>\*</sup>, Dioscuri Centre in Topological Data Analysis Warsaw/IMPAN (1203-57-43321)

4:30PM  
(179.8) *Persistent Laplacians and Möbius Homology*  
**Tatum Rask**<sup>\*</sup>, Colorado State University (1203-55-44831)

***(180) AMS Special Session on Topological and Algebraic Properties of Additive Manufacturing, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM 617, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Bala Krishnamoorthy**, WSU  
**Justin Curry**, University at Albany SUNY  
**Gregory Dreifus**, GE Vernova

1:00PM *Break*

1:30PM *Open Applied Topology: A fast, flexible, user-friendly tool for matrix algebra in TDA*  
▶ ◆ (180.2)  
**Gregory Henselman-Petrusek**, Pacific Northwest National Laboratory (1203-68-44079)

2:00PM *A graph theoretic framework for multi-agent additive manufacturing*  
▶ (180.3)  
**Ryan D. Budney**, University of Victoria, Department of Mathematics and Statistics, **Justin Curry**, University at Albany, SUNY, **Gregory Dreifus**, GE Vernova, **Patrick Christopher Gambill**, Washington State University and **Bala Krishnamoorthy**, Washington State University (1203-55-42201)

2:30PM *Toolpath Planning for Multi Agent AM Applications with ORNL MedUSA system*  
▶ (180.4)  
**Andrzej Nycz**, ORNL, **Alex Arbogast**, Georgia Tech, **Chris Masuo**, ORNL, **Joshua Vaughan**, ORNL, **Peter Wang**, ORNL and **Canhai Lai**, ORNL (1203-93-40341)

3:30PM *Transversal motion planning*  
▶ (180.5)  
**Cesar A. Ipanaque Zapata**, University of Sao Paulo, University of Minnesota (1203-55-44556)

4:00PM *Watertight Meshes for CAD modeling and simulation; a watertight definition that holds water*  
▶ (180.6)  
**Nathan A Jones**, Air Force Research Lab (AFRL), **Brandon Kinard**, Air Force Research Lab, **Rachel Kinard**, Air Force Research Laboratory (AFRL), Sensors Directorate, **Bryan A Curtis**, Iowa State University and **Joshua Rice**, Iowa State University (1203-54-39167)

4:30PM *Topological Complexity and Disk Configuration Spaces*  
▶ (180.7)  
**Nicholas Wawrykow**, University of Chicago (1203-55-42207)

***(181) AMS Special Session on Trends in Coding Theory, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM 605, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Alberto Ravagnani**, Eindhoven University of Technology  
**Giuseppe Cotardo**, Virginia Tech

1:00PM *Linear Programming Approach to Private Information Retrieval*  
▶ (181.1)

**Alex Sprintson**, NSF, **Anoosheh Heidarzadeh**, Santa Clara University and **Ningze Wang**, Texas A&M University (1203-68-45492)

1:30PM *Service Rate Regions of Codes and Matching Polytopes of Hypergraphs*  
▶ (181.2)  
**Hoang Ly Minh**, Rutgers University and **Emina Soljanin**, Rutgers University (1203-05-45402)

2:00PM *Towards Growing Quantum LDPC Codes from Quantum Lego*  
▶ (181.3)  
**Charles Cao**, Virginia Tech (1203-81-43412)

2:30PM *Quantum Anticodes*  
(181.4)  
**Charles Cao**, Virginia Tech, **Giuseppe Cotardo**, Virginia Tech and **Brad Lackey**, Microsoft Corporation (1203-81-43599)

3:00PM *Triorthogonal codes and CSS-T codes*  
(181.5)  
**Eduardo Camps**, Instituto Politécnico Nacional, **Hiram H. Lopez**, Virginia Tech, **Ivan Soprunov**, Cleveland State University, **Gretchen Matthews**, Virginia Tech, **Diego Ruano**, Universidad de Valladolid and **Rodrigo San José**, Universidad de Valladolid (1203-94-45328)

3:30PM *Robust Gray Codes Approaching the Optimal Rate*  
▶ (181.6)  
**Roni Con**, Technion (1203-94-41738)

4:00PM *Capacity of Adversarial Networks in the Multishot Setting*  
◆ (181.7)  
**Giuseppe Cotardo**, Virginia Tech, **Gretchen Matthews**, Virginia Tech, **Alberto Ravagnani**, Eindhoven University of Technology and **Julia Shapiro**, Virginia Tech (1203-94-40910)

4:30PM *Decoding Community Structure in Graphs*  
▶ (181.8)  
**Allison Beemer**, University of Wisconsin-Eau Claire and **Jessalyn Bolkema**, California State University, Dominguez Hills (1203-68-42965)

***(182) AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM Skagit 1, Lower  
Level, Seattle Convention Center  
Arch at 800 Pike

Organizers: **Mark Daniel Ward**, Purdue University  
**Patricia Cahn**, Smith College  
**Khang Duc Tran**, California State University Fresno  
**Darren A. Narayan**, Claremont McKenna College

1:00PM *Constructing Branched Covers from Colored Tri-Plane Diagrams*  
▶ (182.1)  
**Khaylah Johnson Bustamante**, Smith College, **Eliana Lippa**, Smith College, **Maria Maalouf**, Smith College, **Emmarie Miller**, Smith College and **Sophie Ratsimamitaka**, Smith College (1203-57-45105)

1:30PM *Number Theoretic and Combinatorial Properties of Increasing Sequences of Positive Integers*  
▶ ◆ (182.2)

**Almanzo Gao**, Smith College, **Eliana Lippa**, Smith College, **Sanjana Paul**, Smith College, **Amy Pinargote**, Smith College, **Geremias Polanco**, Smith College, **Kanghui Zou**, Smith College and **Emi Neuwalder**, Smith College (1203-11-44551)

2:00PM  
▶ (182.3) *Graph Colorings and Gridlock*  
**Elaine Demetron**, Smith College, **Matthew I Jones**, College of the Holy Cross, **Zorina Sun**, Smith College, **Shayla Welch**, Smith College and **Zachary Winkeler**, Smith College (1203-05-44692)

2:30PM  
▶ ♦ (182.4) *Effective heuristic attack on the simultaneous conjugacy search problem in contracting groups*  
**Kerry Elizabeth Seekamp**, Smith College, **Luciana Scuderi**, Truman State University and **Dmytro Savchuk**, University of South Florida (1203-20-44032)

3:00PM  
▶ ♦ (182.5) *Effective Weights of Numerical Semigroups of Small Depths*  
**Ian R. Farish**, California State Polytechnic University - Pomona, **Erik Imathiu-Jones**, California Institute of Technology, **Nathan Kaplan**, University of California, Irvine, **Fabian Ramirez**, University of California, Irvine, **Deepesh Singhal**, University of California, Irvine and **Victoria Lynne Wiest**, California State University, Fresno (1203-20-45777)

3:30PM  
▶ (182.6) *Hurwitz numbers for the two-equal-cycles partitions  $\lambda=(n,n)$  and transportation polytopes*  
**Isaac Berger**, Brandeis University (1203-05-41469)

4:00PM  
▶ (182.7) *CANCELLED El Niño Bursting and Its Predictability*  
**Erik Bergland**, Brown University, **Hailey Evans**, Cedar Crest College, **Katherine Fuentes**, Stevens Institute of Technology, **Bjorn Sandstede**, Brown University, **Peter Sentz**, Brown University and **Katherine Slyman**, Brown University (1203-37-41664)

4:30PM  
▶ (182.8) *Equilibrium Surface Coverage for Reversible Adsorption of Dimers on Various Finite Lattice Structures*  
**Eunsang Park**, University of California, Merced, **Changho Kim**, University of California, Merced, **Yue Lei**, University of California, Merced and **François Blanchette**, University of California, Merced (1203-60-43939)

***(183) ILAS Special Session on Innovative and Effective Ways to Teach Linear Algebra, I***

THURSDAY, JANUARY 09 1:00PM–5:00PM 204, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Sepideh Stewart**, University of Oklahoma  
**Gil Strang**, MIT  
**Megan Wawro**, Virginia Tech  
**David M. Strong**, Pepperdine University

1:00PM  
▶ (183.1) *Row operations - helping students see the forest, not just the trees*  
**Jeffrey Stuart**, Pacific Lutheran University (1203-97-45222)

1:30PM  
▶ (183.2) *Visualization in Linear Algebra*  
**Judi J McDonald**, Washington State University and **Sepideh Stewart**, University of Oklahoma (1203-97-44650)

2:00PM  
(183.3) *Hands on linear algebra for mathematicians, engineers, and data scientists*  
**Emily J Evans**, Brigham Young University (1203-97-43545)

2:30PM  
▶ (183.4) *Understanding the Null Space and SVD through Application-Inspired Linear Algebra*  
**Thomas J Asaki**, Washington State University, **Heather A Moon**, Washington State University and **Marie A Snipes**, Kenyon College (1203-15-41757)

3:00PM  
▶ (183.5) *The Remaining Challenges and Grassroots Remedies for Modernizing Our Linear Algebra Teachings and Improving our Student Learning Outcomes*  
**Frank Uhlig**, Auburn University (1203-97-44150)

3:30PM  
▶ (183.6) *A Linear Algebra Story: How We Reconstructed a Matrix from its Eigenvalues*  
**Anastasiia Minenkova**, University of Hartford (1203-15-38851)

4:00PM  
▶ (183.7) *Unlocking Hidden Dimensions: The Power of Generalized Eigenvectors*  
**Sheldon Axler**, San Francisco State University (1203-15-42619)

4:30PM  
▶ (183.8) *Incorporating general principles (such as the Conjugation Principle) in the teaching and learning of linear algebra*  
**David Easdown**, University of Sydney (1203-97-42688)

***(184) ILAS Special Session on Inverse Spectral Problems for Nonnegative Matrices, I***

THURSDAY, JANUARY 09 1:00PM–3:30PM 4C-1, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **Pietro Paparella**, University of Washington Bothell

1:00PM  
▶ (184.1) *An experimental approach to the NIEP using algebraic geometry*  
**Benjamin Clark**, Washington State University (1203-15-43607)

1:30PM  
▶ (184.2) *CANCELLED - On Hankel matrices and the symmetric nonnegative inverse eigenvalue problem*  
**Roberto C. Díaz**, Universidad Católica del Norte (1203-15-42164)

2:00PM  
▶ (184.3) *CANCELLED - About the persymmetric nonnegative inverse eigenvalue problem in low dimension*  
**Ana I. Julio**, Universidad Católica del Norte, Antofagasta, Chile (1203-15-42076)

2:30PM (184.4) *Perron similarities and the nonnegative inverse eigenvalue problem*  
**Pietro Paparella\***, University of Washington Bothell and **Charles Royal Johnson**, None (1203-15-43425)

3:00PM (184.5) *Stochastic matrices and the boundary of the Karpelevich region*  
**Stephen Kirkland\***, University of Manitoba, **Helena Smigoc**, University College Dublin and **Priyanka Joshi**, University College Dublin (1203-15-43432)

### ***JMM Workshop on Artificial Intelligence and Game Theory: An Intersection of Theory and Applications***

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THURSDAY, JANUARY 09 1:00PM–2:30PM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Mark S. Lovett**, Dartmouth College  
**Brian Mintz**, Dartmouth College

### ***MAA Panel: AI Transformed: Navigating the New Landscape for Business, Industry, Government and Education***

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THURSDAY, JANUARY 09 1:00PM–2:30PM 4C-4, Level Four, Seattle Convention Center Arch at 705 Pike

This panel explores the profound impact of AI developments, particularly focusing on large language models and their broad implications. Industry experts and academics will delve into AI's transformative effects on both traditional and emerging sectors, showcasing AI-driven innovations in business and the evolving job landscape. Additionally, the panel will address how mathematics and data science education is adapting to integrate AI, preparing students for AI-enhanced environments.

Organizers: **Vinodh Kumar Chellamuthu**, Dixie State University  
**Thomas Philip Wakefield**, Youngstown State University  
**Jan Rychtar**, Virginia Commonwealth University  
**Dr. Mihhail Berezovski, PhD**, Embry-Riddle Aeronautical University  
**Dr. Mihhail Berezovski, PhD**, Embry-Riddle Aeronautical University

### ***(185) MAA Special Session on Assessment Practices that Support Equity and Inclusion, II***

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THURSDAY, JANUARY 09 1:00PM–5:00PM 610, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Heather Smith Blake**, Davidson College  
**Jessica Oshaughnessy**, West Chester University  
**Andrew C Lee**, St. Thomas Aquinas College  
**Brittney Falahola**, Stephen F. Austin State University

**Sheila Tabanli**, Rutgers University – New Brunswick.

**Amanda Harsy Ramsay**, Lewis University

1:00PM (185.1) *An Abridgement of a Prep Course Focusing On Data Analytics: A Four-Year Analysis*  
**Salvatore P Giunta\***, Babson College, **Madison Odam**, Babson College, **Kirsten Lytle**, Babson College and **Sejal Patil**, Babson College (1203-97-41950)

1:30PM (185.2) *Comparative Analysis of Pre-Calculus Student Performance Based on Preexisting Mathematical Knowledge, Access, and the Role of Differentiated Instruction*  
**Amit A Savkar\***, University of Connecticut (1203-97-43200)

2:00PM (185.3) *A Cross-Institutional Collaboration to Adopt Standards-Based Grading in Calculus I and Precalculus*  
**Lipika Deka**, California State University, Monterey Bay, **Alison Gordon Lynch\***, California State University, Monterey Bay, **Jennifer Moorhouse**, Hartnell College, **Senorina Vazquez**, Hartnell College and **Jeffrey Wand**, California State University, Monterey Bay (1203-101-43532)

2:30PM (185.4) *Implementing Grading for Growth in Your Classroom*  
**Adam Lee Schultze\***, Lewis University, **Nathan Fox**, Canisius University, **Amanda Harsy Ramsay**, Lewis University, **Sarah Klanderma**, Marian University, **Marie Meyer**, Lewis University, **Erica Kathleen Oldaker**, Gordon College, **Michael Smith**, Lewis University, **Brittany Stephenson**, Lewis University and **Cara Sulyok**, Lewis University (1203-101-43530)

3:00PM (185.5) *Analyzing the Impact of Alternate Assessment in Mathematics Courses*  
**Cara Sulyok\***, Lewis University, **Nathan Fox**, Canisius University, **Amanda Harsy Ramsay**, Lewis University, **Sarah Klanderma**, Marian University, **Marie Meyer**, Lewis University, **Erica Kathleen Oldaker**, Gordon College, **Adam Lee Schultze**, Lewis University, **Michael Smith**, Lewis University and **Brittany Stephenson**, Lewis University (1203-101-43510)

3:30PM (185.6) *Alternative Grading to Support an Equitable Environment*  
**Rebecca I Swanson\***, Colorado School of Mines (1203-101-44491)

4:00PM (185.7) *Implementing Alternative Grading Practices: A Department Case Study*  
**Lynda Wynn\***, California State University, Stanislaus and **Jessica De Silva**, California State University, Stanislaus (1203-101-44636)

4:30PM (185.8) *Combining Team-Based Inquiry Learning with Alternative Grading to Support Equity in the Classroom*  
**Abby Noble\***, Middle Georgia State University (1203-101-42156)

***(186) MRC Algebraic Combinatorics, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM Tahoma 5, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Kyle Celano**, Wake Forest University  
**Samuel Armon**, University of Southern California  
**Magda Hlavacek**, Pomona College  
**Alexander N Wilson**, Oberlin College  
**Spencer Daugherty**, University of Colorado Boulder

1:00PM (186.1) *Properties of the Stable Tamari Lattice*  
**Herman Chau**<sup>\*</sup>, University of Washington, **Spencer Daugherty**, University of Colorado Boulder, **Sean Grate**, Auburn University, **Juan Carlos Martinez Mori**, Georgia Institute of Technology and **Anna Pun**, University of Virginia (1203-05-44753)

1:30PM (186.2) *A  $sq$ -analog of Kostant's Weight Multiplicity Formula and a Product of Fibonacci*  
**Kimberly J Harry**<sup>\*</sup>, UW-Milwaukee (1203-17-41191)

2:00PM (186.3) *A Characterization of the Weyl Alternation Set for Negative Roots of Type A Lie Algebras*  
**Owen Goff**<sup>\*</sup>, University of Wisconsin - Madison, **Portia Anderson**, Cornell University, **Esther Banaian**, University of California, Riverside, **Melanie J Ferreri**, William & Mary, **Kimberly P. Hadaway**, Iowa State University, **Pamela Estephania Harris**, Williams College, **Kimberly J Harry**, UW-Milwaukee, **Nicholas Mayers**, North Carolina State University, **Shiyun Wang**, University of Minnesota Twin Cities and **Alexander N Wilson**, Oberlin College (1203-05-44131)

2:30PM (186.4) *Quiver Representations Through Juggling*  
**Portia Anderson**, Cornell University, **Esther Banaian**, University of California, Riverside, **Melanie J Ferreri**<sup>\*</sup>, William & Mary, **Owen Goff**, University of Wisconsin - Madison, **Kimberly P. Hadaway**, Iowa State University, **Pamela Estephania Harris**, Williams College, **Kimberly J Harry**, UW-Milwaukee, **Nicholas Mayers**, North Carolina State University, **Shiyun Wang**, University of Minnesota Twin Cities and **Alexander N Wilson**, Oberlin College (1203-05-44124)

3:00PM (186.5) *Spectrum of random-to-random shuffling in the Hecke algebra*  
**Patty Commins**<sup>\*</sup>, University of Minnesota - Twin Cities (1203-05-40361)

3:30PM (186.6)  *$sq$ -Chromatic Polynomial and Tree Isomorphism Conjecture*  
**Robbie Angarone**, University of Minnesota - Twin Cities, **Kyle Celano**, Wake Forest University, **Patty Commins**, University of Minnesota - Twin Cities, **Rosa Orellana**, Dartmouth College, **Jianping Pan**, Arizona State University and **Mary Claire Simone**<sup>\*</sup>, University of California, Davis (1203-05-41101)

4:00PM (186.7) *The Chromatic Symmetric Function of Unicyclic Graphs*

**Rosa C. Orellana**, Dartmouth College, **Jianping Pan**, NCSU, **Aram Bingham**, Colorado School of Mines, **Lisa Johnston**, UC Davis, **Colin M. Lawson**<sup>\*</sup>, Stephen F. Austin State University and **Chelsea Sato**, Syracuse University (1203-05-40986)

4:30PM (186.8) *Commutative Properties of Polygonal Schubert Puzzles*

**Portia Anderson**<sup>\*</sup>, Cornell University (1203-05-45558)

***(187) MRC Climate Science at the Interface Between Topological Data Analysis and Dynamical Systems Theory, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM Tahoma 1, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Sushovan Majhi**, George Washington University  
**Wenwen Li**, St. Mary's College of Maryland  
**Cameron Edgar**, Williams College  
**Daniela Beckelhymer**, University of Minnesota, Twin Cities

1:00PM (187.1) *Topological Feature Tracking in Climate Systems*  
**Wanchen Zhao**<sup>\*</sup>, University of Florida (1203-55-45145)

1:30PM (187.2) *Dynamics-Aware Filtrations I*  
**Benjamin Daniel Jones**<sup>\*</sup>, Michigan State University, **Kristin Kurianski**, California State University Fullerton, **Fangfei Lan**, University of Utah, **Miguel R Lopez**, University of Pennsylvania, **Christopher Potvin**, Warren Wilson College, **Sunia Tanweer**, Michigan State University and **Tobias Timofeyev**, University of Vermont (1203-55-44496)

2:00PM (187.3) *Dynamics Aware Filtrations II*  
**Sunia Tanweer**<sup>\*</sup>, Michigan State University, **Kristin Kurianski**, California State University Fullerton, **Fangfei Lan**, University of Utah, **Miguel R Lopez**, University of Pennsylvania, **Christopher Potvin**, Michigan State University, **Benjamin Daniel Jones**, Michigan State University and **Tobias Timofeyev**, University of Vermont (1203-55-43593)

2:30PM (187.4) *Designing statistical tests for topological significance*  
**Isaac Xiaoran Ren**<sup>\*</sup>, KTH (1203-62-42529)

3:00PM *Break/Discussion*

3:30PM (187.6) *Investigating bifurcations using persistent homology*  
**Enrique Guadalupe Alvarado**<sup>\*</sup>, UC Davis, **Daniela Beckelhymer**, University of Minnesota, Twin Cities, **Joshua Dorrington**, University of Oxford, **Théo Lacombe**, Maître de conférence, LIGM, Université Gustave Eiffel, **Tung Lam**, University at Albany, SUNY, **Sushovan Majhi**, George Washington

University and **Jasmine Noory**, University of Minnesota (1203-37-43524)

4:00PM  
▶ ◆ (187.7)  
*Predicting the Onset and Withdrawal of the Indian Monsoon using Persistent Homology*  
**Sushovan Majhi**<sup>\*</sup>, George Washington University, **Enrique Guadalupe Alvarado**, UC Davis, **Daniela Beckelhymer**, University of Minnesota, Twin Cities, **Joshua Dorrington**, University of Oxford, **Théo Lacombe**, Maître de conférence, LIGM, Université Gustave Eiffel, **Tung Lam**, University at Albany, SUNY and **Jasmine Noory**, University of Minnesota (1203-37-43551)

4:30PM *Ending Discussion*

### (188) MRC Homotopical Combinatorics, II

THURSDAY, JANUARY 09 1:00PM–5:00PM Tahoma 2, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Millie Rose**, University of Kentucky  
**Valentina Zapata Castro**, University of Virginia  
**Danika Van Niel**, Michigan State University  
**Devin Hensley**, Auburn University

1:00PM  
(188.1)  
*Equivariant trees and partition complexes*  
**Julie Bergner**<sup>\*</sup>, University of Virginia, **Peter Bonventre**, U.S. Government, **Maxine Elena Calle**, University of Pennsylvania, **David Chan**, Michigan State University and **Maru Sarazola**, University of Minnesota (1203-55-42161)

1:30PM  
▶ (188.2)  
*Transfer system complexity of  $\mathcal{S}C_{\{p \wedge q \wedge m\}}$*   
**Katharine Adamyk**, Hamline University, **Scott Balchin**, Queen's University Belfast, **Miguel Barrero**, University of Aberdeen, **Steven Scheirer**<sup>\*</sup>, Susquehanna University, **Yuri Sulyma**, Industry, **Noah Wisdom**, Northwestern University and **Valentina Zapata Castro**, University of Virginia (1203-05-43019)

2:00PM  
(188.3)  
*Realizing Transfer Systems as Operads via Slices of Coinduced Operads*  
**Ben Szczesny**<sup>\*</sup>, Ohio State University (1203-55-41854)

2:30PM  
▶ (188.4)  
*Self-duality of the lattice of transfer systems*  
**Evan E Franchere**<sup>\*</sup>, University of Kentucky, **Kyle Ormsby**, Reed College, **Angélica M Osorno**, Reed College, **Weihang Qin**, Reed College and **Riley Waugh**, Reed College (1203-55-40429)

3:00PM  
◆ (188.5)  
*Localizations of model structures on lattices*  
**Cherry Ng**<sup>\*</sup>, Northwestern University (1203-55-43666)

3:30PM  
▶ (188.6)  
*Compatibility with Disk-Like Transfer Systems I*  
**David DeMark**<sup>\*</sup>, University of Minnesota, **Michael Hill**, University of Minnesota, **Yigal Kamel**, University of Illinois Urbana-Champaign, **Nelson Niu**, University of Washington, **Kurt Stoeckl**, University of Melbourne, **Danika Van Niel**, Binghamton University and **Guoqi Yan**, University of Notre Dame (1203-55-42055)

4:00PM  
▶ (188.7)  
*Compatibility with Disk-Like Transfer Systems II*

**David DeMark**, University of Minnesota, **Michael Hill**, University of California, Los Angeles, **Yigal Kamel**, University of Illinois Urbana-Champaign, **Nelson Niu**, University of Washington, **Kurt Stoeckl**, University of Melbourne, **Danika Van Niel**, Binghamton University and **Guoqi Yan**, University of Notre Dame (1203-55-41015)

4:30PM  
▶ ◆ (188.8)  
*Model structures on finite rectangular lattices*  
**Kristen Mazur**, Elon University, **Angelica M. Osorno**<sup>\*</sup>, Reed College, **Constanze Roitzheim**, University of Kent, **Rekha Santhanam**, IIT Bombay, **Danika Van Niel**, Binghamton University and **Valentina Zapata Castro**, Univ of Virginia (1203-18-43799)

### (189) MRC Mathematics of Adversarial, Interpretable, and Explainable AI, II

THURSDAY, JANUARY 09 1:00PM–5:00PM Chelan 5, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Siddharth Vishwanath**, University of California, San Diego  
**Anna Aboud**, Westmont College  
**Lander ver Hoef**, Cooperative Institute For Research In the Atmosphere (CIRA)  
**Morgan Weiler**, Cornell University  
**Kelly Lang**, American Mathematical Society

1:00PM  
(189.1)  
*Three Pieces in Adversarial, Interpretable, and Explainable AI*  
**Dennis Wei**<sup>\*</sup>, IBM Research (1203-68-43631)

2:00PM  
▶ (189.2)  
*CANCELLED - Graph Embedding for Community Detection*  
**Zhifeng Wei**<sup>\*</sup>, Pacific Northwest National Laboratory (1203-05-42440)

2:30PM  
▶ (189.3)  
*Metric Geometry of Latent Representations*  
**Evgeniya Lagoda**<sup>\*</sup>, Freie Universität Berlin, **Tom Needham**, Florida State University, **Morgan Weiler**, Cornell University, **Shiying Li**, University of Nebraska-Lincoln, **Sixu Li**, University of Wisconsin-Madison, **Lander ver Hoef**, Cooperative Institute For Research In the Atmosphere (CIRA) and **Yaoying Fu**, Boston College (1203-53-42169)

3:00PM  
(189.4)  
*The Geometric Scattering Transform*  
**Michael Perlmutter**<sup>\*</sup>, Boise State University (1203-68-44054)

3:30PM  
▶ (189.5)  
*An overview of Partial Optimal transport*  
**Kaiying O'Hare**<sup>\*</sup>, Johns Hopkins University (1203-28-42964)

4:00PM  
(189.6)  
*Robustness properties of a partial Gromov-Wasserstein distance defined via relaxed couplings*  
**Daniel McBride**<sup>\*</sup>, University of Tennessee, Knoxville (1203-49-39519)

4:30PM  
(189.7)  
*Transformer learning as a Heat Flow*

**Medha Agarwal**<sup>\*</sup>, University of Washington, Seattle, **Garrett Mulcahy**, University of Washington, Seattle, **Zaid Harchaoui**, University of Washington, Seattle and **Soumik Pal**, University of Washington (1203-60-44616)

**(190) NAM Special Session on the Legacy of Elbert Frank Cox: First African American PhD in Mathematics**

**THURSDAY, JANUARY 09 1:00PM–5:00PM 3A, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Edray Herber Goins**, Pomona College  
**Asamoah Nkwanta**, Morgan State University

1:00PM  
▶ (190.1) *Reflections on Elbert Frank Cox's Iconic Achievement in 1925: A Strategy for Success*  
**Johnny L. Houston**<sup>\*</sup>, Nam-Elizabeth City State University (1203-01-45781)

1:30PM  
▶ ♦ (190.2) *Evansville, Indiana: Home of the First Black PhD Mathematician*  
**Talitha M Washington**<sup>\*</sup>, Clark Atlanta University & Atlanta University Center (1203-104-45682)

2:00PM  
▶ ♦ (190.3) *Coaching, Overcoming, & eXcelling: Celebrating the Robust Legacy of Elbert Frank Cox*  
**Christopher C. Jett**<sup>\*</sup>, Georgia State University (1203-97-42981)

2:30PM  
▶ ♦ (190.4) *Epidemics in Queues*  
**Jamol J. Pender**<sup>\*</sup>, School of Operations Research and Information Engineering, Cornell University (1203-60-45721)

3:00PM  
(190.5) *Compact Approximation Without a Basis*  
**Tepper L. Gill**<sup>\*</sup>, Howard University (1203-47-42755)

3:30PM  
▶ (190.6) *Mathematics of malaria transmission dynamics: the renewed quest for eradication*  
**Abba Gumel**<sup>\*</sup>, University of Maryland (1203-92-42459)

4:00PM *Panel Discussion: Cox's Legacy and the Future of Black PhDs in Math*

**(191) PME Contributed Session on Research by Undergraduates, I**

**THURSDAY, JANUARY 09 1:00PM–5:00PM 615, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Thomas Philip Wakefield**, Youngstown State University  
**Chad Awtrey**, Samford University

1:00PM  
▶ (191.1) *Proving the Prime Number Theorem and its Relationship to the Riemann Zeta Function*  
**Thomas James Jordan**<sup>\*</sup>, Graduate Student (1203-11-46528)

1:15PM  
▶ ♦ (191.2) *Controlling Chaos in a One Parameter Map of the Interval*  
**Tanvi Kiran**<sup>\*</sup>, Hendrix College (1203-37-46306)

1:30PM  
▶ (191.3) *Enhancement of Biocontrol via Predator Interference and Additional Food*  
**Kendall Hope Bearden**<sup>\*</sup>, Samford University and **Kwadwo Antwi-Fordjour**, Samford University (1203-92-46010)

1:45PM  
▶ (191.4) *Using Integer Covering Systems to find Repdigit and Other Forms of Riesel and Sierpiński Numbers*

**Chris Bispels**<sup>\*</sup>, University of Maryland, Baltimore County, **Matthew Cohen**, Carnegie Mellon University, **Joshua Harrington**, Cedar Crest College, **Joshua Lowrance**, Biola University, **Kaelyn Pontes**, Hastings College, **Leif Erik Schaumann**, Kenyon College, Department of Mathematics, **Nathan Shank**, Moravian University and **Tony Wing Hong Wong**, Kutztown University of Pennsylvania (1203-11-42241)

2:00PM  
▶ ♦ (191.5) *Identifying the Factors Affecting the Survival of Trauma Patients Using Logistic Regression Analysis*

**Maggie Smith**<sup>\*</sup>, Murray State University, **Manoj Pathak**, Murray State University and **Simon Thompson**, Billings Clinic (1203-62-46013)

2:15PM  
▶ (191.6) *Statistical Connections between Graph Structure and Maximum Independent Sets*  
**Chaucer M.L. Ihrig**<sup>\*</sup>, Murray State University and **Dubravko Ivansic**, Murray State University (1203-62-46375)

2:30PM  
▶ (191.7) *Deciphering Mutation Dynamics: A Computational Analysis of Selective Pressures in Barrett's Esophagus and Esophageal Adenocarcinoma*

**Kira Alexa Glasmacher**<sup>\*</sup>, Emmanuel College, Boston, MA, Yale University, New Haven, CT, **Vincent L Cannataro**, Emmanuel College, Boston, MA and **Yulia Dementieva**, Emmanuel College, Boston, MA (1203-92-40732)

2:45PM  
▶ ♦ (191.8) *Elliptic Epicycloids & Hypocycloids (part 1)*  
**Haneul Seo**<sup>\*</sup>, Hope College (1203-51-46315)

3:00PM  
▶ (191.9) *Elliptic Epicycloids & Hypocycloids (part 2)*  
**Stephen F Price**<sup>\*</sup>, Hope College (1203-51-46292)

3:15PM  
▶ (191.10) *Evaluating convolutional neural networks for reconstructing Compton scatter tomography images*

**Karsten G. Wiegierink**<sup>\*</sup>, Hope College (1203-62-46276)

3:30PM  
▶ (191.11) *On the Parameter Tuning Challenge of Scalable Spectral Clustering Methods*  
**Valen Michael Feldmann**<sup>\*</sup>, Hope College, **Eli S Edwards-Parker**, Hope College and **Guangliang Chen**, Hope College (1203-62-46527)

3:45PM  
▶ (191.12) *A Relative K-means Approach to Parameter Tuning in Spectral Clustering*  
**Eli S Edwards-Parker**<sup>\*</sup>, Hope College (1203-62-46384)

- 4:00PM *On the Graph Laplacian and its Applications in Machine Learning*  
▶ (191.13) **Yiting Shen**<sup>\*</sup>, Hope College (1203-62-46264)
- 4:15PM *Training Artificial Intelligence Agents to Play a Family of Combinatorial Games*  
▶ (191.14) **Sidney Emma Wright**<sup>\*</sup>, Hope College and **Lina Mo**<sup>\*</sup>, Hope College (1203-05-46271)
- 4:30PM *Developing Intuitive Multiplication Fact Strategies with Young Students*  
▶ (191.15) **Megan Hayduk**<sup>\*</sup>, Hope College (1203-97-46086)
- 4:45PM *Evaluating reconstruction of tomographic images with multi-layer perceptron neural networks*  
▶ (191.16) **Sydney Rose Olander**<sup>\*</sup>, Hope College (1203-62-46353)

***(192) PME Contributed Session on Research by Undergraduates, II***

THURSDAY, JANUARY 09 1:00PM–5:00PM 616, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Chad Awtrey**, Samford University

- 1:00PM *A Framework for Approximating Perturbed Optimal Control Problems*  
▶ (192.1) **Riley Link**<sup>\*</sup>, Creighton University and **Ethan Ebbighausen**, University of North Carolina Chapel Hill (1203-49-43690)
- 1:15PM *Improving Exponential Random Graph Models (ERGMs) Using Scaffolding for Enhanced Scalability and Reduced Degeneracy*  
▶ (192.2) **Nick J Forbes**<sup>\*</sup>, Creighton University (1203-92-44745)
- 1:30PM *Lights Out on a Random Nearly Complete Graph*  
▶ ◆ (192.3) **Riya Goyal**<sup>\*</sup>, Stockton University (1203-05-46103)
- 1:45PM *From Parsimony to Divergence in a Stochastic DCJ-Indel Model of Genome Evolution*  
▶ (192.4) **Nafisa Anzum Raisa**<sup>\*</sup>, Fordham University, **Poly Hannah da Silva**, Columbia University and **Arash Jamshidpey**, Columbia University (1203-92-46578)
- 2:00PM *Reconstruction of Radiating Point Sources in a 2D Acoustic Waveguide*  
▶ ◆ (192.5) **Isabella Garcia**<sup>\*</sup>, Marist College, **Thu Le**, Kansas State University, **Julia Lewis-Borgia**, Smith College, **Dinh-Liem Nguyen**, Kansas State University, **Nhung Nguyen**, Kansas State University and **Ashley Song**, Rice University (1203-35-45946)
- 2:15PM *A Microscopic Computational Model for Traffic Jams*  
▶ (192.6) **Nicholas Mankowski**<sup>\*</sup>, Ohio Wesleyan University, **Hassan Mushtaq**, Ohio Wesleyan University and **Hanliang Guo**, Ohio Wesleyan University (1203-00-46201)
- 2:30PM *Fixed Perimeter Analogues of Classical Partition Identities*  
▶ (192.7)

- Gabriel Paul Gray**<sup>\*</sup>, University of Dayton, **Ren Watson**, University of Texas At Austin, **Emily Payne**, University of Texas Rio Grande Valley and **Holly Swisher**, Oregon State University (1203-11-44050)
- 2:45PM *Gradient flow of Voronoi diagrams with repulsion*  
▶ (192.8) **Alexander Dolce**<sup>\*</sup>, University of Scranton (1203-37-42251)
- 3:00PM *Geometric Homomorphisms from Surface Groups to Free Groups*  
▶ ◆ (192.9) **Qianqian Wu**<sup>\*</sup>, Grinnell College and **Stephanie Huang**<sup>\*</sup>, Harvey Mudd College (1203-55-46572)
- 3:15PM *Garside shadows between the Shi-0 and Shi-1 arrangements in  $\mathcal{A}_2$*   
▶ ◆ (192.10) **Jordan Christopher Bounds**, Furman University, **Menna Ellaqany**<sup>\*</sup>, Furman University, **Devin Bryant**, Furman University, **Sam Housand**, Furman University and **Yeeka Yau**, University of Sydney (1203-20-46434)
- 3:30PM *Joins of elements in Coxeter groups*  
▶ ◆ (192.11) **Jordan Christopher Bounds**, Furman University, **Sam Housand**<sup>\*</sup>, Furman University, **Devin Bryant**, Furman University, **Menna Ellaqany**, Furman University and **Yeeka Yau**, University of Sydney (1203-20-46438)
- 3:45PM *Clustering Analysis of Obesity and Nutritional Variations Across the United States*  
▶ (192.12) **Christine Jator**<sup>\*</sup>, Undergraduate Mathematics Student in Pi Mu Epsilon (1203-62-46185)
- 4:00PM *Multi-Stage Optimal Transport*  
▶ (192.13) **Abihith Kothapalli**<sup>\*</sup>, Vanderbilt University, **Rocío Díaz Martín**, Tufts University and **Akram Aldroubi**, Vanderbilt University (1203-49-46134)
- 4:15PM *A SIMPL Model of Phage-Bacteria Interactions Accounting for Mutation and Competition*  
▶ (192.14) **Darsh Gandhi**<sup>\*</sup>, University of Texas at Arlington (1203-92-38006)
- 4:30PM *Introduction to adversarial machine learning through control theoretic formulations*  
▶ (192.15) **Vikhyat Agarwal**<sup>\*</sup>, University of Richmond, **Kritim K. Rijal**, University of Richmond and **Caitlin Sales**, University of Richmond (1203-93-46316)
- 4:45PM *Odd Perfects, Multiply Perfects, and Non-Divisors, oh my! An Exploration of the Odd Perfect Number Problem*  
▶ (192.16) **Jasmine Wetter Hiebert**<sup>\*</sup>, Western Oregon University (1203-11-46407)

***(193) PME Contributed Session on Research by Undergraduates, III***

THURSDAY, JANUARY 09 1:00PM–5:00PM 618, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Thomas Philip Wakefield**, Youngstown State University  
**Chad Awtrey**, Samford University

- 1:00PM *Index of Lie proset algebras*  
▶ ◆ (193.1) **Celia Kerr**<sup>\*</sup>, William and Mary and **Nicholas Russoniello**<sup>\*</sup>, Lehigh University (1203-16-46397)
- 1:15PM *Petri: A Framework for Creating and Analyzing Model Organisms of Misalignment in Large Language Models*  
▶ (193.2) **James Elmore**<sup>\*</sup>, William & Mary (1203-68-46600)
- 1:30PM *Not Losing the Trees for the Forest: Mathematical Modeling of Trees Blowing in the Wind*  
▶ (193.3) **Lucas Brandt**<sup>\*</sup>, Gonzaga University (1203-92-45902)
- 1:45PM *A Pure Taxicab Perspective on Circles and Euclid's Elements*  
▶ (193.4) **Quinn Russell**<sup>\*</sup>, St. Norbert College and **Jonathan D. Dunbar**<sup>\*</sup>, St. Norbert College (1203-51-45662)
- 2:00PM *The Game of Cycles on Wheel Graphs*  
▶ (193.5) **Tyler Blom**<sup>\*</sup>, St. Norbert College (1203-102-46019)
- 2:15PM *Determining Surface Elevation and Turbulence in Open Channel Flow Using Video Analysis*  
▶ (193.6) **Kyle Ruhland**<sup>\*</sup>, St. Norbert College (1203-68-46279)
- 2:30PM *Modeling the Free Surface of Gravity-Driven Flows Using Image Processing*  
▶ (193.7) **Sam C Nass**<sup>\*</sup>, St. Norbert College (1203-76-46284)
- 2:45PM *Modeling Algal Population Dynamics in Lacustrine Environments*  
▶ ◆ (193.8) **Sydney Vitalbo**<sup>\*</sup>, St. Norbert College (1203-92-46274)
- 3:00PM *Modeling a Seasonal Growth Rate for Aulocoseira in Trout Lake, WI*  
▶ ◆ (193.9) **Brianna Marie Partyka**<sup>\*</sup>, St. Norbert College (1203-92-46275)
- 3:15PM *The Distinguishing Index of Mycielskian of Star Graphs*  
▶ (193.10) **Rowan Kennedy**<sup>\*</sup>, Grand Valley State (1203-05-46255)
- 3:30PM *Guessing games to determine 1 of several secret numbers*  
▶ (193.11) **Kyle McKee**<sup>\*</sup>, Grand Valley State University, **Julia Osmun**<sup>\*</sup>, Grand Valley State University and **Dorian Schlutt**<sup>\*</sup>, Grand Valley State University (1203-91-46365)
- 3:45PM *Special Values of Bessel Functions for Subgroups of  $\text{GL}(n)$*   
▶ (193.12) **Kevin Le**<sup>\*</sup>, Texas A&M University and **David Cates**<sup>\*</sup>, Texas A&M University (1203-11-46401)
- 4:00PM *Modeling Tumor and Cancer Stem Cells in the Presence of TGF- $\beta$  Treatment, Cancer Immunotherapy in the Form of CAR-T and Effector Cells.*  
▶ (193.13) **Joseph Robert Puetz**<sup>\*</sup>, Augusta University (1203-92-46009)

- 4:15PM *Modeling the impacts of spatial structure on evolution in bacteria*  
▶ (193.14) **Amanda Barlow**<sup>\*</sup>, Brigham Young University-Idaho, **Natalie Marie Dando**<sup>\*</sup>, Youngstown State University and **Sabrina Ingram**<sup>\*</sup>, The University of Alabama (1203-92-46290)
- 4:30PM *Offline Guessing Games with Two Numbers*  
▶ (193.15) **Justin Sciullo**<sup>\*</sup>, Grand Valley State University, **Lisa Shen**<sup>\*</sup>, Grand Valley State University and **Sarah Zaske**<sup>\*</sup>, Grand Valley State University (1203-91-46080)
- 4:45PM *Embedding Lambda Calculus into Haskell with Safety Features*  
▶ (193.16) **Seunghoon Oh**<sup>\*</sup>, Texas A&M University (1203-68-45957)

**(194) PME Contributed Session on Research by Undergraduates, IV**

THURSDAY, JANUARY 09 1:00PM–5:00PM 619, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Thomas Philip Wakefield**, Youngstown State University  
**Chad Awtrey**, Samford University

- 1:00PM *Lower Semicontinuity of Integral Operators with respect to  $SL_p$  Functions*  
▶ ◆ (194.1) **Zachary Alexander Duah**<sup>\*</sup>, University of Michigan (1203-49-46491)
- 1:15PM *Bent Hamiltonian Paths in Toroidal Grid Graphs and Applications to the Snake Cube Puzzle*  
▶ (194.2) **Jamie Parker Shepard**<sup>\*</sup>, Andrews University (1203-05-46379)
- 1:30PM *Minimum Distances of an Infinite Class of Toric Surface Codes*  
▶ ◆ (194.3) **Eliza Hogan**<sup>\*</sup>, University of Michigan - Flint, **Jenna Plute**<sup>\*</sup>, Texas A&M University, **Amelia Gibbs**<sup>\*</sup>, Trinity University, **Kelly Jabbusch**<sup>\*</sup>, University of Michigan Dearborn and **Nicholas Toloczko**<sup>\*</sup>, University of North Carolina - Wilmington (1203-94-38151)
- 1:45PM *Zeros of Period Polynomials*  
▶ (194.4) **Jennifer Mackenzie**<sup>\*</sup>, Texas A&M University, **Grace Ko**<sup>\*</sup>, Vanderbilt University and **Hui Xue**<sup>\*</sup>, Clemson University (1203-11-45948)
- 2:00PM *On the number of plane graphs of point sets with a small convex hull*  
▶ ◆ (194.5) **Neely Lovvorn**<sup>\*</sup>, University of North Alabama and **Oscar Murillo-Espinoza**<sup>\*</sup>, California State University Monterey Bay (1203-05-46155)
- 2:15PM *Random Matrix Theory for Symmetric Matrices*  
▶ (194.6) **Nir Elber**<sup>\*</sup>, University of California, Berkeley (1203-11-44343)
- 2:30PM *CANCELLED - Mordell's Theorem and Further Developments*  
▶ ◆ (194.7) **Yeju Shin**<sup>\*</sup>, University of Massachusetts Amherst (1203-11-45797)
- 2:45PM *Perspicacious  $L_p$  norm parameters*  
▶ (194.8)

**Eric Ren**<sup>\*</sup>, Arizona State University (1203-13-44806)

3:00PM *The Linear Targeting Problem*  
▶ (194.9) **Kyle Bierly**<sup>\*</sup>, Pomona College, **Stephan Ramon Garcia**, Pomona College and **Roger Horn**, University of Utah (1203-15-43286)

3:15PM *Describing Hilbert series of quasi-invariants in characteristics  $p \nmid n$*   
▶ (194.10) **Frank Wang**, MIT and **Eric Yee**<sup>\*</sup>, MIT PRIMES (1203-16-45713)

3:30PM *Morita Equivalence of Combinatorial Inverse Semigroups with Zero*  
▶ (194.11) **Stian Du Preez**<sup>\*</sup>, Rice University (1203-20-46427)

3:45PM *Fractal Measure and Density*  
▶ (194.12) **Yifan Li**<sup>\*</sup>, The University of Michigan (1203-28-44001)

4:00PM *Braiding on Categories of Superselection Sectors*  
▶ ♦ (194.13) **Anupama Bhardwaj**, The Ohio State University, **Tristen Brisky**<sup>\*</sup>, University of Pennsylvania, **Chian Yeong Chuah**, The Ohio State University, **Kyle Kawagoe**, The Ohio State University, **Joseph Keslin**, University of Illinois Urbana-Champaign, **David Penneys**, The Ohio State University and **Daniel Wallick**, The Ohio State University (1203-46-45071)

4:15PM *Ancient and expanding spin ALE Ricci flows*  
▶ (194.14) **Isaac Marcelo Lopez**<sup>\*</sup>, Massachusetts Institute of Technology (1203-53-39154)

4:30PM *Heegaard Floer homology  $HF^{\infty}(Y)$  over the integers*  
▶ ♦ (194.15) **Analisa C Faulkner Valiente**<sup>\*</sup>, Barnard College of Columbia University and **Mike Miller Eismeier**, University of Vermont (1203-57-42399)

4:45PM *Presentations of Kauffman bracket skein algebras*  
▶ (194.16) **Chloe Marple**<sup>\*</sup>, Pomona College and **Helen Wong**, Claremont McKenna College (1203-57-46206)

### ***Professional Enhancement Program (PEP) 1B: Building Conceptual Understanding of Multivariable Calculus using 3D Visualization in CalcPlot3D and 3D-Printed Surfaces***

**THURSDAY, JANUARY 09 1:00PM–3:00PM Willow A, Second Floor, Sheraton Grand Seattle**

CalcPlot3D is a free online 3D graphing app designed to enhance the teaching and learning of multivariable calculus. In this hands-on workshop, participants will learn the features of CalcPlot3D, how to use it effectively in their teaching, and how to create explorations. They will also experience a series of small group learning activities using 3D-printed surfaces and CalcPlot3D. These activities help students visualize and better understand a variety of three-dimensional calculus concepts.

Organizers: **Shelby Stanhope**, U.S. Air Force Academy  
**Paul E. Seeburger**, Monroe Community College

### ***Professional Enhancement Program (PEP) 2B: Leveraging GitHub and AI for Mathematics Research and Teaching***

**THURSDAY, JANUARY 09 1:00PM–3:00PM Willow B, Second Floor, Sheraton Grand Seattle**

Mathematics projects enabled by the GitHub social coding platform include open-source textbooks, databases of mathematical objects, computational software, libraries of formalized mathematics, and more. Participants in this program will learn how to get started with the GitHub platform and the GitHub Copilot AI pair programmer to create and collaborate on mathematical projects with colleagues and students, requiring only a web browser.

Organizers: **Oscar Levin**, University of Northern Colorado  
**Steven Craig Clontz**, University of South Alabama

### ***(195) SIAM Minisymposium on Scientific Machine Learning: Recent Advances and Future Directions, II***

**THURSDAY, JANUARY 09 1:00PM–5:00PM 2B, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Steven Lee**, Department of Energy – Office of Science  
**Panagiotis Stinis**, Pacific Northwest National Laboratory

1:00PM *Digital twins for engineering and scientific discovery: multimodality, structure-preservation, and UQ*  
▶ (195.1) **Nathaniel Trask**<sup>\*</sup>, University of Pennsylvania (1203-65-45100)

1:30PM *Real Time Bayesian Inference for High Fidelity Digital Twins Governed by Linear Time Invariant Systems*  
(195.2) **Omar Ghattas**<sup>\*</sup>, Oden Institute, The University of Texas at Austin, **Sreeram Venkat**, Oden Institute, The University of Texas at Austin, **Stefan Henneking**, Oden Institute, The University of Texas at Austin and **Milinda Fernando**, Oden Institute, The University of Texas at Austin (1203-49-42758)

2:00PM *Scalable, adaptive, and explainable scientific machine learning for the improved predictability of chaotic dynamical systems*  
▶ (195.3) **Shivam Barwey**, Argonne National Laboratory and **Romit Maulik**<sup>\*</sup>, Pennsylvania State University, Argonne National Laboratory (1203-68-40134)

2:30PM *Break*

3:00PM *SINDy-RL: Interpretable and Efficient Model-Based Reinforcement Learning*  
▶ (195.5) **Nicholas Zolman**<sup>\*</sup>, University of Washington, **Urban Fasel**, Imperial College London, **J Nathan Kutz**, University of Washington and **Steven L Brunton**, University of Washington (1203-49-40129)

3:30PM *Overview of Oak Ridge National Laboratory's AI Initiative: Advancing Secure, Trustworthy, and Energy-Efficient AI for Scientific Discovery*  
▶ (195.6) **Prasanna Balaprakash**<sup>\*</sup>, Oak Ridge National Laboratory (1203-68-41042)

4:00PM *Panel discussion "The future of scientific machine learning"*

**(196) SIGMAA Contributed Paper Session on Using AI in Mathematics Instruction**

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THURSDAY, JANUARY 09 1:00PM–3:00PM 609, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Brian D Walton**, James Madison University  
**Bernd Sing**, University of the West Indies at Cave Hill  
**Joseph Edward Fields**, Southern Connecticut State University  
**Shanda Renee Hood**, University of Arkansas

1:00PM *Using AI to Decrease Anxiety*  
▶ (196.1) **Shanda Renee Hood**<sup>\*</sup>, University of Arkansas and **Nama Namakshi**, University of Arkansas (1203-97-36771)

1:15PM *Generative AI in a Freshman "Tech Fluency" course*  
▶ (196.2) **Joseph Edward Fields**<sup>\*</sup>, Southern Connecticut State University (1203-101-45640)

1:30PM *Examples of Mathematics Projects Using AI*  
▶ (196.3) **Bernd Sing**<sup>\*</sup>, University of the West Indies (1203-101-45811)

1:45PM *Using AI to create and manipulate data sets for use in undergraduate teaching*  
▶ (196.4) **Joshua Girshner**<sup>\*</sup>, University of Arkansas (1203-101-44943)

2:00PM *Potential of Digital Collaborative Environment with Artificial Intelligence for Productive Disciplinary Engagement*  
▶ (196.5) **Alden Jack Edson**<sup>\*</sup>, Michigan State University and **Elizabeth D Phillips**, Michigan State University (1203-97-44862)

2:15PM *Rethinking Secondary School Mathematics Goals and Objectives in an Artificial Intelligence Enhanced World: Implications for College Mathematics*  
▶ (196.6) **Alden Jack Edson**<sup>\*</sup>, Michigan State University and **Elizabeth D Phillips**, Michigan State University (1203-97-44880)

2:30PM *Fast-flipping a Calculus 3 class using AI help*  
▶ (196.7) **John Ross**<sup>\*</sup>, Southwestern University (1203-101-45095)

2:45PM *AI in the Equation: Student Utilization Patterns in Mathematics, Statistics, and Data Science Courses*  
▶ (196.8) **Samantha Robinson**<sup>\*</sup>, University of Arkansas and **James Roddy**, University of Arkansas (1203-97-40293)

**(197) SLMath (MSRI) Special Session on MSRI-UP 2024 Mathematical Endocrinology, II**

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THURSDAY, JANUARY 09 1:00PM–5:00PM 611, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Erica Graham**, Bryn Mawr College  
**Candice Price**, Smith College

1:00PM *Follicular Circadian Reproductive Rhythms: A Mathematical Model*  
▶ ◆ (197.1) **Stella Cardoso**<sup>\*</sup>, California Polytechnic State University, San Luis Obispo, **Vidushi Mittal**, University of California, Santa Barbara and **Ijenu Okongwu**, Temple University (1203-92-44323)

1:30PM *Effect of exogenous 17-Beta Estradiol on beta cells in patients with Type 2 Diabetes*  
▶ ◆ (197.2) **Sofia Velazquez**<sup>\*</sup>, The Evergreen State College (1203-34-41739)

2:00PM *Analysis of a Mathematical Model for the Population Dynamics of Women with Gestational Diabetes*  
▶ ◆ (197.3) **Isiaha Akatzin Rodriguez**<sup>\*</sup>, Arizona State University, **Javier Garcia Espinosa**, University of Washington, Seattle and **Alex Gaither**, University of California, Santa Barbara (1203-92-44208)

2:30PM *3D Chemical Shift Imaging in MRI: Sparse Sampling and Fast Total Variation Reconstruction*  
▶ ◆ (197.4) **Talon Johnson**<sup>\*</sup>, University of Texas Southwestern Medical Center (1203-65-44625)

3:00PM *Preview: Quantitative Justice at MSRI Up 2025*  
▶ ◆ (197.5) **Robin T Wilson**<sup>\*</sup>, Loyola Marymount University and **Omayra Ortega**, Sonoma State University (1203-104-45597)

**W + AM Alumnae Coffee Hour**

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THURSDAY, JANUARY 09 1:00PM–2:00PM Medina, Third Floor, Sheraton Grand Seattle

If you previously attended a Women+ and Mathematics program at the Institute for Advanced Study, please join us for coffee, tea, and fellowship.

Organizers: **Madeleine Perez**, Institute for Advanced Study  
**Nicole Maldonado**, IAS

**(198) AMS Special Session on The Teaching and Learning of Undergraduate Ordinary Differential Equations, II**

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THURSDAY, JANUARY 09 1:30PM–5:00PM Chelan 4, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Viktoria Savatorova**, Central Connecticut State University  
**Beverly H West**, Cornell University  
**Maila B. Hallare**, US Air Force Academy, USAFA CO USA  
**Itai Seggev**, Wolfram Research  
**Johannah L Crandall**, University of Michigan

- 1:30PM  
▶ (198.1) *Efficacy and Value of Student Self-Assessment in ODEs*  
**Tom J Clark**<sup>\*</sup>, Dordt University (1203-97-43082)
- 2:00PM  
▶ (198.2) *Parameters and Logarithms: Making Separable ODE Meaningful*  
**Christopher Oehrlein**<sup>\*</sup>, Oklahoma City Community College (1203-101-44790)
- 2:30PM  
▶ (198.3) *Solving Linear Systems of ODEs and Discovering Jordan Form*  
**Donald AM Muench**<sup>\*</sup>, St. John Fisher University (1203-34-44413)
- 3:00PM  
▶ (198.4) *Incorporating Rigid Body Dynamics in an Undergraduate ODE Class*  
**Joseph Eichholz**<sup>\*</sup>, United States Air Force Academy and **Simon W Jones**, Rose-Hulman Institute of Technology (1203-101-45009)
- 3:30PM  
▶ (198.5) *The 3D Double Spherical Pendulum - An Undergraduate Research Project*  
**James Sochacki**<sup>\*</sup>, James Madison University, Power Series Solutions, LLC and **Alexander Gofen**, Taylor Center (1203-34-45064)
- 4:00PM  
▶ (198.6) *Engage with CODEE: Shaping the Future of ODE in the Undergraduate Classroom*  
**Maila B. Hallare**<sup>\*</sup>, US Air Force Academy, USAFA CO USA, **Johannah L Crandall**, University of Michigan, **Viktoria Savatorova**, Central Connecticut State University, **Itai Seggev**, Wolfram Research and **Beverly H West**, Cornell University (1203-101-45720)

**(199) AMS Special Session on Recent Advancement in Control Theory and Applications in Artificial Intelligence, II**

THURSDAY, JANUARY 09 2:00PM–5:00PM 205, Level Two, Seattle Convention Center Arch at 705 Pike

- Organizers: **Bonny Banerjee**, University of Memphis  
**Shalmali Bandyopadhyay**, University of Tennessee at Martin
- 2:00PM  
(199.1) *Modeling and control of bittide synchronization dynamics*  
**Sanjay Lall**<sup>\*</sup>, Stanford University, Google DeepMind (1203-93-44339)
- 3:00PM  
▶ (199.2) *SELP: A framework for implementing the perception-action loop in an AI agent*  
**Bonny Banerjee**<sup>\*</sup>, University of Memphis (1203-68-44283)
- 4:00PM  
▶ (199.3) *Harnessing Generative AI for Efficient Assessment Creation in Education*  
**Amish Mishra**<sup>\*</sup>, Taylor University (1203-97-38856)

**(200) AMS Special Session on Spectral Theory and Mathematical Physics, II**

THURSDAY, JANUARY 09 2:00PM–6:00PM 203, Level Two, Seattle Convention Center Arch at 705 Pike

- Organizers: **Christoph Fischbacher**, University of California, Irvine  
**Jonathan Stanfill**, Baylor University
- 2:00PM  
(200.1) *Localization for Disordered Oscillator Models*  
**Robert Sims**<sup>\*</sup>, University of Arizona, **Houssam Abdul-Rahman**, UAE University and **Gunter Stolz**, UAB (1203-81-44982)
- 3:00PM  
(200.2) *Spectral bounds for periodic Jacobi operators*  
**Burak Hatinoglu**<sup>\*</sup>, Michigan State University (1203-47-42066)
- 3:30PM  
(200.3) *The Unitary Almost-Mathieu Operator*  
**Jacob D. Fillman**<sup>\*</sup>, Texas A&M University (1203-34-40383)
- 4:00PM  
(200.4) *LTQO and spectral gap stability for the AKLT model on the hexagonal lattice*  
**Thomas Jackson**, University of California, Davis, **Bruno Nachtergaele**<sup>\*</sup>, University of California, Davis and **Amanda Young**, University of Illinois Urbana-Champaign (1203-82-43618)
- 5:00PM  
(200.5) *Eigenstates of the Walsh quantized baker's map*  
**Laura Shou**<sup>\*</sup>, University of Maryland (1203-81-41688)
- 5:30PM  
(200.6) *Rational solutions to the mKdV equation*  
**Giorgio Young**<sup>\*</sup>, University of Michigan (1203-35-42633)

**(201) AMS Special Session on Variational Methods in Quantum Computing, II**

THURSDAY, JANUARY 09 2:00PM–5:00PM 606, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Michael Ragone**, University of California, Davis  
**Jason Saied**, NASA Ames Research Center  
**Carlos Ortiz Marrero**, Pacific Northwest National Laboratory
- 2:00PM  
(201.1) *Dynamical Lie algebras*  
**Bojko N Bakalov**<sup>\*</sup>, North Carolina State University (1203-17-44060)
- 2:30PM  
(201.2) *Hybrid quantum-classical algorithms for quantum optimal control*  
**Alicia Magann**<sup>\*</sup>, Sandia National Laboratories (1203-68-44693)
- 3:00PM  
(201.3) *Accelerated gradient descent methods and saddle points*  
**Ryan W. Murray**<sup>\*</sup>, North Carolina State University (1203-49-43874)
- 3:30PM  
▶ (201.4) *Random coordinate descent: A simple alternative for optimizing parameterized quantum circuits*  
**Zhiyan Ding**<sup>\*</sup>, University of California, Berkeley (1203-65-42526)
- 4:00PM  
◆ (201.5) *Understanding Quantum Circuit Layers: A New Metric for Evaluating Unitary Expressibility*  
**Sarah Chehade**<sup>\*</sup>, Oak Ridge National Laboratory (1203-81-43575)

4:30PM *Open Problem Session B*  
▶ (201.6) **Michael Ragone**<sup>\*</sup>, University of California, Berkeley (1203-81-44813)

**(202) ASL Special Session on Combinatorial Set Theory, II**

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THURSDAY, JANUARY 09 2:00PM–4:30PM 2A, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Spencer Unger**, University of Toronto  
**James W Cummings**, Carnegie Mellon University

2:00PM *On some finitizations of  $\mathcal{C}$  and  $CH$ .*  
◆ (202.1) **Jorge Antonio Cruz Chapital**<sup>\*</sup>, University of Toronto (1203-03-40848)

2:30PM *Tree Properties at Many Cardinals*  
(202.2) **William Adkisson**<sup>\*</sup>, UCLA (1203-03-43480)

3:00PM *Break*

3:30PM *The  $\Sigma_2$ -Potentialist Principle*  
(202.4) **Gabriel Goldberg**<sup>\*</sup>, UC Berkeley (1203-03-44936)

4:00PM *A Fraïssé theory for partial orders of a fixed finite dimension*  
▶ (202.5) **Iain Smythe**<sup>\*</sup>, University of Winnipeg (1203-06-40852)

**(203) NSF Special Session on Exploring Funding Opportunities in the Division of Mathematical Sciences, I**

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THURSDAY, JANUARY 09 2:00PM–5:00PM 603, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Elizabeth L Wilmer**, Oberlin College

2:00PM *Funding Opportunities for Early-Career Researchers*  
▶ (203.1) **Andy Raich**<sup>\*</sup>, National Science Foundation (1203-00-46674)

2:30PM *NSF Funding Opportunities in Emerging Areas of the Mathematical Sciences*  
▶ ◆ (203.2) **Jodi Mead**<sup>\*</sup>, National Science Foundation (1203-00-46675)

3:00PM *DMS Office Hours- Program officers will be available to answer your questions related to funding opportunities in mathematical sciences! Please stop by and meet your DMS program officers in person. No appointments needed.*

3:30PM *Tips on Proposal Writing*  
▶ (203.4) **Jan Cameron**<sup>\*</sup>, National Science Foundation (1203-00-46676)

4:00PM *Broader Impacts Demystified*  
▶ (203.5) **Elizabeth Wilmer**<sup>\*</sup>, National Science Foundation, **Junping Wang**, National Science Foundation, **Wing Suet Li**, NSF and **Troy Butler**, National Science Foundation (1203-00-46677)

4:30PM *DMS Office Hours- Program officers will be available to answer your questions related to NSF funding opportunities in mathematical sciences! Please stop by and meet your program officers in person. No appointments needed.*

**(204) ASA Invited Address - Bonnie Ghosh-Dastidar, RAND**

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THURSDAY, JANUARY 09 2:10PM–3:15PM Ballroom 6C, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Ron Wasserstein**, American Statistical Association  
**Donna E LaLonde**, American Statistical Association  
**Ron Wasserstein**, American Statistical Association

2:10PM *Informing Policy and Countering Misinformation*  
▶ (204.1) **Bonnie Ghosh Dastidar**<sup>\*</sup>, RAND (1203-62-39932)

**(205) The Spectra Lavender Lecture - Emmy Murphy, University of Toronto, Mississauga**

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THURSDAY, JANUARY 09 2:10PM–3:15PM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Michael A. Hill**, UCLA  
**Devavrat Dabke**, Level Ventures

2:10PM *Symplectic topology of Stein manifolds*  
▶ (205.1) **Emmy Murphy**<sup>\*</sup>, University of Toronto, Mississauga (1203-00-36478)

**CANCELLED AMS Fireside CEO Chat**

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THURSDAY, JANUARY 09 3:00PM–4:30PM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike

Experience a Fireside Chat with CEOs and leaders at the 2025 Joint Mathematics Meetings! Engage in candid discussions as industry leaders share insights and visions for the future. Dive into topics like innovation, leadership, and the evolving tech landscape. Don't miss this exclusive opportunity to network with top-tier executives.

Organizer: **Sarah Bryant**, American Mathematical Society

**Joint Committee on Women Panel: Outreach and Public Engagement to Expand the Mathematical Pipeline**

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THURSDAY, JANUARY 09 3:00PM–4:30PM 4C-3, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Nancy J Sattler**, Terra State Community College  
**Jennifer Schultens**, University of California, Davis  
**Brandy S. Wieggers**, College of Idaho  
**Zvezdelina Stankova**, UC Berkeley

Anna Bargagliotti, Loyola Marymount  
Rose Kaplan-Kelly, Temple University  
Uta Lorenzen, SLMath

**TPSE Panel: Practices of Effective Mathematics  
Departments**

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THURSDAY, JANUARY 09 3:00PM–4:30PM 4C-4, Level Four,  
Seattle Convention Center Arch at  
705 Pike

The past several years have been a tough time for universities brought about by declining enrollment and budget deficits. Administrators have decided to reduce the number of faculty positions and eliminate certain majors and programs. While mathematics departments appear to be successful and healthy at many universities, it is not at others. In this session, the panelists will outline common characteristics that have helped to shape their mathematics department into a thriving department.

Organizers: **Scott Andrew Wolpert**, University of Maryland and TPSE Math

**Michael Dorff**, MAA President, Brigham Young University

**Tyler Jarvis**, Brigham Young University

**Ayse Arzu Sahin**, Wright State University

**(206) AWM-AMS Noether Lecture - Neena Gupta,  
Indian Statistical Institute**

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THURSDAY, JANUARY 09 3:20PM–4:25PM Ballroom 6E,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

3:20PM *The Abhyankar-Sathaye Conjecture for Linear  
Hyperplanes*

► (206.1) **Neena Gupta**<sup>\*</sup>, Indian Statistical Institute  
(1203-14-36735)

**MAA Project NEXt: Establishing Your  
Undergraduate Research Program**

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THURSDAY, JANUARY 09 3:30PM–4:45PM 609, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Getting an undergraduate research program up and running comes with a number of challenges, both mathematical and logistical. In this session, we will discuss initiating research projects with undergraduate students in departmental and REU settings. Topics will include funding, creating a sustainable research program for undergraduates, and positive and productive group dynamics.

Organizers: **Casey Pinckney**, Carroll College

**Nurul Raihen**, Fontbonne University

**Samuel Tripp**, Worcester Polytechnic Institute

**Emily Heath**, Iowa State University

**Vinodh Kumar Chellamuthu**, Dixie State University

**Andrés Meléndez**, Harvey Mudd College

**Michael Ferrara**, Division of Undergraduate Education, National Science Foundation

**(207) AMS Josiah Willard Gibbs Lecture - Yann  
LeCun, Meta**

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THURSDAY, JANUARY 09 5:00PM–6:00PM Ballroom 6E,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

5:00PM *Mathematical Obstacles on the way to Human-  
Level AI*

► (207.1) **Yann LeCun**<sup>\*</sup>, Meta/CIMS-NYU (1203-00-36483)

**Friday, January 10**

**Joint Meetings Registration**

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FRIDAY, JANUARY 10 7:30AM–4:00PM Atrium Lobby,  
Level Four, Seattle Convention  
Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

**(208) AMS Contributed Paper Session on  
Combinatorics, Graph Theory, Order, and General  
Algebraic Systems, III**

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FRIDAY, JANUARY 10 8:00AM–12:00PM 307, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizer: **Brian D. Boe**, University of Georgia

8:00AM *Characteristic Polynomial of Universal  
Adjacency Matrix of Power Graph on Some  
Groups*

► ◆ (208.1) **Komal Kumari**<sup>\*</sup>, Indian Institute of Kharagpur and **Pratima Panigrahi**, Indian Institute of Kharagpur (1203-05-41678)

8:15AM *Algebraic Structures on Graphs Joined by  
Edges*

► ◆ (208.2) **Daniel Pinzon**<sup>\*</sup>, Georgia Gwinnett College, **Daniel Prigel**, Georgia Gwinnett College and **Joshua Roberts**, Georgia Gwinnett College (1203-05-44084)

8:30AM *Signal Processing on Cayley Graphs*  
► ◆ (208.3) **Kathryn Beck**<sup>\*</sup>, University of Delaware, **Mahya Ghandehari**, University of Delaware, **Jenna Paltenstein**, University of Delaware and **Skyler Hudson**, University of Massachusetts Amherst (1203-05-45780)

8:45AM *Optimal couplings of undirected graphs with  
applications in detecting graph isomorphisms*  
► (208.4) **Phuong N Hoang**<sup>\*</sup>, UNC Charlotte, **Bongsoo Yi**, UNC Chapel Hill, **Kevin McGoff**, UNC Charlotte and **Andrew B Nobel**, UNC Chapel Hill (1203-05-43468)

9:00AM *A dichotomy theorem on the complexity of 3-  
uniform hypergraphic degree sequence  
graphicality*  
► (208.5) **Angelina Zhang**<sup>\*</sup>, University of Michigan, **Sara Logsdon**, University of Georgia, **Arya Maheshwari**, Princeton University and **István Miklós**, Rényi Institute, Hungarian Academy of Sciences (1203-05-39630)

9:15AM *Unavoidable Hypergraphs of Finite Rank*  
▶ (208.6) **Samuel Weiner\***, Louisiana State University and **Guoli Ding**, Louisiana State University (1203-05-43672)

9:30AM *CANCELLED- Symmetry Parameters of Praeger-Xu Graphs*  
▶ (208.7) **Sally Cockburn\***, Hamilton College and **Max Jeffrey Klivans**, Hamilton College (1203-05-40288)

9:45AM *Independent sets in a percolated hypercube*  
(208.8) **Mriganka Basu Roy Chowdhury**, University of California, Berkeley, **Shirshendu Ganguly**, University of California, Berkeley and **Vilas Winstein\***, University of California, Berkeley (1203-05-43764)

10:00AM *On Functoriality of the Clique-replacement & Line Graphs*  
(208.9) **William Benjamin Grillette\***, National Security Agency (1203-05-44991)

10:15AM *CANCELLED Kemeny's Constant for Graphs*  
▶ (208.10) **Mark Kempton\***, Brigham Young University (1203-05-42085)

10:30AM *Pancyclicity Of Almost Planar Graphs*  
▶ ♦ (208.11) **Santiago T. Adams\***, California Institute of Technology and **Sandra R Kingan**, Brooklyn College and the Graduate Center, CUNY (1203-05-43085)

10:45AM *Heating Up Quasi-Monte Carlo Graph Random Features: A Diffusion Kernel Perspective*  
▶ (208.12) **Brooke Caroline Feinberg\***, Scripps College and **Aiwen Li**, University of Pennsylvania (1203-05-38983)

11:00AM *The maximum weight independent set problem and almost bipartite tree decompositions*  
▶ (208.13) **Rose McCarty**, Georgia Institute of Technology, **Caleb McFarland**, Georgia Institute of Technology, **Anshul Tripathy\***, Georgia Institute of Technology and **Zach Walsh**, Auburn University (1203-05-45066)

11:15AM *Edge Erasures and Chordal Graphs*  
(208.14) **Peter F Stiller\***, Texas A&M University (1203-05-45090)

***(209) AMS Contributed Paper Session on Commutative Algebra and Algebraic Geometry***

FRIDAY, JANUARY 10 8:00AM-12:00PM 302, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

8:00AM *The Slope of V-Function and Waldschmidt Constant*  
▶ (209.1) **Manohar Kumar\***, Indian Institute of Technology Kharagpur, India, **Ramakrishna Nanduri**, Indian Institute of Technology Kharagpur, India and **Kamalesh Saha**, Chennai Mathematical Institute, Chennai, India (1203-13-37115)

8:15AM *Domination Numbers in Zero-Divisor Graphs of Commutative Rings*  
▶ (209.2)

**Sarah E. Anderson**, University of St. Thomas, **Michael Axtell**, University of St. Thomas, **Brenda K Kroschel**, University of St. Thomas and **Joe A. Stickles\***, Millikin University (1203-13-44815)

8:30AM *CANCELLED Subintegrality and ideal class groups of monoid algebras*  
(209.3)

**Md Abu Raihan\***, Indian Institute of Technology Kharagpur, **Leslie G. Roberts**, Queen's University and **Husney Parvez Sarwar**, Indian Institute of Technology Kharagpur (1203-13-40269)

8:45AM *Exceptional Collections for Toric Varieties*  
▶ ♦ (209.4) **Reginald Cyril Wallis Anderson\***, Claremont McKenna College (1203-14-45724)

9:00AM *CANCELLED Classification of forms of tori using separable algebras*  
▶ (209.5) **Pankaj Singh\***, University of South Carolina and **Alexander Duncan**, University of South Carolina (1203-14-42172)

9:15AM *Real  $Skq$ -resolutions*  
(209.6) **Jackson Morris\***, University of Washington (1203-14-43191)

9:30AM *Compactifications of the Moduli Space of Plane Curves with Marked Points*  
(209.7) **Aaron Goodwin\***, UC Riverside (1203-14-42735)

9:45AM *On triviality of  $\mathbb{A}^2$ -fibration over a DVR*  
▶ (209.8) **Parnashree Ghosh\***, Visiting Fellow, School of Mathematics, TIFR, India (1203-14-44486)

10:00AM *Curves with spinor Abelian Jacobians admitting Clifford actions*  
♦ (209.9) **Ivona Grzegorzczuk\***, CSU and Nicolaus Copernicus Academy and **Ricardo Benjamin Suarez**, California State University Channel Islands (1203-14-44581)

10:15AM *Hessenberg Varieties and K-orbit Closures*  
(209.10) **Ozlem Ugurlu\***, Saint Louis University (1203-14-45645)

10:30AM *Spinor Abelian Varieties and Clifford multiplication.*  
▶ ♦ (209.11) **Ricardo Benjamin Suarez\***, California State University Channel Islands and **Ivona Grzegorzczuk**, CSU and Nicolaus Copernicus Academy (1203-14-44610)

10:45AM *The Cayley-Bacharach Condition*  
(209.12) **Rohan S Nair\***, Emory University (1203-14-45201)

11:00AM *On the rigidity of Pham-Brieskorn surfaces*  
▶ (209.13) **Ananya PAL\***, Indian Statistical Institute, Kolkata (1203-14-44466)

11:15AM *On a residual coordinate which is a non-trivial line*  
▶ (209.14) **Amartya Kumar Dutta\***, Professor in Mathematics, Stat-Math Unit, Indian Statistical Institute, Kolkata (1203-14-44663)

***(210) AMS Contributed Paper Session on Geometry***

**FRIDAY, JANUARY 10 8:00AM–12:00PM 309, Level Three,  
Seattle Convention Center Arch at  
705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 8:00AM *The Pirouetting Photon*  
▶ (210.1) **Andrew James Simoson\***, King University (1203-51-41672)
- 8:15AM *CANCELLED Floral Orthogonal Polytopes*  
(210.2) **David Andrew Richter\***, Western Michigan University (1203-52-42315)
- 8:30AM *Transformation group of certain affine homogeneous manifolds*  
◆ (210.3) **Omar Saldarriaga\***, High Point University (1203-53-44415)
- 8:45AM *Oriented matroids and biclosed sets*  
◆ (210.4) **Katherine Tung\***, Harvard University and **Grant Barkley**, Harvard University (1203-52-44142)
- 9:00AM *On Extended Face Semigroup of Hyperplane Arrangements*  
▶ ◆ (210.5) **Mohammed Tesemma\***, Spelman College and **Sade Fisher**, Spelman College (1203-52-42648)
- 9:15AM *Recent Progress on the Fractional Yamabe Problem*  
(210.6) **A. Sophie Aiken\***, University of California Santa Cruz (1203-53-43903)
- 9:30AM *Sectional Curvature Pinching of Two-Step Nilmanifolds*  
(210.7) **Tomoya Tatsuno\***, University of Oklahoma (1203-53-43861)
- 9:45AM *CANCELLED Sasaki-Einstein Rational Homology 7-spheres and the Berglund-H\"ubsch Transpose Rule*  
(210.8) **Ralph Rudolph Gomez\***, Swarthmore College, **Jaime Cuadros Valle**, Pontificia Universidad Cat\u00f3lica del Per\u00fa and **Joe Lope Vicente**, Pontificia Universidad Cat\u00f3lica del Per\u00fa (1203-53-41318)
- 10:00AM *Investigating the Algebra  $\mathcal{B}$  From Hypertoric Geometry*  
(210.9) **Tim Ablondi\***, North Carolina State University (1203-53-44539)
- 10:15AM *A Discrete Curvature Approach to the Drill String Bending Problem*  
▶ (210.10) **Arthur Mills\***, Oregon State University (1203-53-42093)

***(211) AMS Contributed Paper Session on History, Biography, Logic and Foundations***

**FRIDAY, JANUARY 10 8:00AM–12:00PM 306, Level Three,  
Seattle Convention Center Arch at  
705 Pike**

Organizers: **Ellen J Maycock**, Independent Scholar  
**Brian D. Boe**, University of Georgia

- 8:00AM *Uncountable Proper Subgroups of  $\mathbb{R}$*   
▶ (211.1)

**Cecily Bartsch\***, Loyola University Chicago and **Xiang Wan**, Loyola University Chicago (1203-03-41544)

- 8:15AM *Alcuin of York and the Origins of River-Crossing Puzzles*  
▶ (211.2) **Suzanne Sumner\***, University of Mary Washington (1203-01-39927)
- 8:30AM *CANCELLED Benedicti Herbesti Neapolitani's Arithmetica Linearis: Eastern European school textbook from 16th century*  
▶ (211.3) **Tetyana Berezovskii\***, Saint Joseph's University, Philadelphia and **Oleg Gutik**, National University of Lviv (1203-01-42876)
- 8:45AM *Seeking the origins of the "peasant" multiplication algorithm*  
▶ (211.4) **Mark McKinzie\***, St. John Fisher University (1203-01-44138)
- 9:00AM *101 Half Truths and Other Lies about Mathematicians in Rhyme*  
▶ (211.5) **Michael E Matthews\***, University of Nebraska at Omaha (1203-01-44512)
- 9:15AM *Sequential Apportionments from Stationary Divisor Methods*  
▶ (211.6) **Michael A. Jones\***, Mathematical Reviews | AMS, **Brittany Ohlinger**, Independent Researcher and **Jennifer M. Wilson**, Eugene Lang College, The New School (1203-91-42747)
- 9:30AM *Algorithmic Approximation of  $\sqrt{2}$  using Fractran*  
▶ ◆ (211.7) **Khushi Kaushik\***, Undergrad Student and **Thomas Murphy**, Professor of Mathematics at CSU, Fullerton (1203-03-38366)
- 9:45AM *The Cubic Formula and its Consequences*  
▶ (211.8) **Michael Janssen\***, Dordt University (1203-01-43594)
- 10:00AM *Archimedes' Quadrature of the Parabola*  
▶ (211.9) **William Linderman\***, King University (1203-01-43899)

***(212) AMS Contributed Paper Session on Partial Differential Equations, I***

**FRIDAY, JANUARY 10 8:00AM–12:00PM 308, Level Three,  
Seattle Convention Center Arch at  
705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 8:00AM *Weak Solutions of Nonlinear Elliptic PDEs with Monotone Nonlinearities*  
(212.1) **Timothy Ira Myers\***, Howard University, **Nsoki Mavinga**, Swarthmore College and **M. N. Nkashama**, University of Alabama at Birmingham (1203-35-41605)
- 8:15AM *On the Steady State Solutions to a 2D Smoluchowski equation*  
▶ (212.2) **Giangvuthanh Nguyen\***, Old Dominion University, **Xiang Xu**, Old Dominion University and **Xin Yang Lu**, Lakehead University (1203-35-44243)

- 8:30AM  
▶ (212.3) *Inverse Iteration for the Laplace Eigenvalue Problem with Robin and Mixed Boundary Conditions*  
**Benjamin August Lyons\***, Rose-Hulman Institute of Technology, **Ephraim Ruttenberg**, University of Maryland, Baltimore County and **Nicholas Zitzelberger**, Oregon State University (1203-35-38755)
- 8:45AM  
◆ (212.4) *Strichartz Estimates for the N-Body Wave Equation with Small Interacting Potentials*  
**Tristan Reynoso\***, Louisiana State University (1203-35-45547)
- 9:00AM  
▶ (212.5) *Periodic Solutions and Resonance in Coupled Wave-Heat Systems*  
**Evan Sheldon\***, University of Maryland, Baltimore County and **Justin Thomas Webster**, University of Maryland, Baltimore County (1203-35-42294)
- 9:15AM  
▶ (212.6) *Cahn-Hilliard Model on Two-Dimensional Lattices: Dynamical Transition Theory and Pattern Formation*  
**Jared Seth Grossman\***, Department of Mathematics and Statistics, Boston University, **Evan Halloran**, Department of Mathematics, Indiana University Bloomington and **Shouhong Wang**, Department of Mathematics, Indiana University, Bloomington, Indiana 47405, USA (1203-35-44845)
- 9:30AM  
(212.7) *CANCELLED Spatially extended dislocations produced by the dispersive Swift-Hohenberg equation*  
**Brenden Balch\***, University of Central Oklahoma, **Patrick Shipman**, Colorado State University and **Richard Mark Bradley**, Colorado State University (1203-35-45345)
- 9:45AM  
▶ (212.8) *On the long time behavior of Alfvén waves*  
**Han Liu\***, University of Memphis, **Weiren Zhao**, NYU Abu Dhabi, **Nader Masmoudi**, New York University, Abu Dhabi and **Cuili Zhai**, University of Science and Technology Beijing (1203-35-43261)
- 10:00AM  
(212.9) *Borel-plane analysis of Schrödinger equations*  
**Bart Rosenzweig\***, The Ohio State University (1203-35-44979)
- 10:15AM  
▶ ◆ (212.10) *Positive Solutions for a Derivative Dependent  $p$ -Laplacian Equation with Riemann-Stieltjes Integral Boundary Conditions*  
**Jaffar Ali Shahul Hameed\***, Florida Gulf Coast University and **Seshadev Padhi**, Birla Institute of Technology, Mesra, Ranchi-835215, India (1203-35-42592)
- 10:30AM  
(212.11) *Stable Periodic Solutions of a Delayed Reaction-Diffusion Model of Hes1-mRNA Interactions*  
**Mohammed Alanazi\***, PhD Student in Applied Mathematics, Division of Computing, Analytics & Mathematics, School of Science and Engineering, University of Missouri-Kansas City (1203-35-45575)
- 10:45AM  
▶ (212.12) *Uniqueness theorems for inverse boundary value problems in quasilinear anisotropic media.*

**Md Ibrahim Kholil\***, Norfolk State University (1203-35-45379)

- 11:00AM  
(212.13) *Boundary convergence of natural  $SpS$ -means to  $SpS$ -harmonic functions*  
**Diego Ricciotti\***, California State University, Sacramento (1203-35-44141)
- 11:15AM  
(212.14) *Piecewise Regular Solutions to Scalar Balance Laws with Singular Nonlocal Sources*  
**Lorena Bociu**, NC State University, **Evangelia Ftaka\***, NC State University, **Tien Khai Nguyen**, North Carolina State University and **Jacopo Schino**, North Carolina State University (1203-35-42864)
- 11:30AM  
(212.15) *Convergence to nonlinear diffusion wave for solution of  $SM_1$  model with Neumann boundary*  
**Balakrishna Chhatria\***, Indian Institute of Technology Kharagpur (1203-35-44675)
- 11:45AM  
◆ (212.16) *Spectral Stability of traveling waves in a thin-layer two-fluid Couette flow*  
**German Jose Mora Saenz\***, The Ohio State University and **Saleh Tanveer**, The Ohio State University (1203-35-41018)

### AMS Graduate School Fair

FRIDAY, JANUARY 10 8:00AM–11:00AM Hall 4B, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Sarah Klyberg**, American Mathematical Society  
**Lexie Ekstrom**, American Mathematical Society  
**Rosalynde Vas Dias**, American Mathematical Society  
**Rosalynde Vas Dias**, American Mathematical Society

### (213) AMS Special Session on Advances in Modeling and Analysis in Life Sciences, I

FRIDAY, JANUARY 10 8:00AM–12:00PM Skagit 4, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Daozhou Gao**, Cleveland State University  
**Xiang-Sheng Wang**, University of Louisiana at Lafayette  
**Daozhou Gao**, Cleveland State University  
**Xiang-Sheng Wang**, University of Louisiana at Lafayette

8:00AM  
(213.1) *Epidemic dynamics of cholera with impulsive sanitation*  
**Xueying Wang\***, Washington State University (1203-34-41562)

8:30AM  
(213.2) *Viral infection dynamics with cell-to-cell transmission and immune chemokines*  
**Xiang-Sheng Wang\***, University of Louisiana at Lafayette (1203-92-44653)

9:00AM  
▶ (213.3) *Identification of factors driving tick dynamics through mathematical models*  
**Holly D Gaff\***, Old Dominion University and **Shania Sanderson**, Old Dominion University (1203-92-41437)

9:30AM (213.4) *The importance and challenges of transient dynamics in ecology*  
**Alan Hastings\***, University of California Davis, Santa Fe Institute (1203-92-44798)

10:00AM (213.5) *Dynamics of a reaction-diffusion intraguild predation model with prey-taxis and alarm-taxis*  
**Junping Shi\***, College of William & Mary, **Jun Wang**, Jiangsu University and **Xuan Wang**, Jiangsu University (1203-92-40908)

10:30AM (213.6) *Modeling viral infection with pharmacokinetics and pharmacodynamics*  
**Libin Rong\***, University of Florida (1203-92-44362)

11:00AM (213.7) *Original Antigenic Sin in CD4+ T Cells*  
**Junling Ma\***, University of Victoria (1203-92-44353)

11:30AM (213.8) *Mathematical assessment of the role of sterile male mosquito release on malaria dynamics and control*  
**Abba Gumel\***, University of Maryland (1203-92-41805)

**(214) AMS Special Session on Advances in Nonlinear Dispersive and Kinetic Equations, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 303, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Justin A. Holmer**, Brown University  
**Maja Taskovic**, Emory University  
**Svetlana Roudenko**, Florida International University

8:00AM (214.1) *Global existence and uniqueness of solutions to the Boltzmann hierarchy*  
**Joseph Kentaro Miller\***, Stanford University (1203-35-45026)

8:30AM (214.2) *Six-wave kinetic equation in exponentially weighted  $L^1$  spaces*  
**Natasa Pavlovic**, The University of Texas at Austin, **Maja Taskovic**, Emory University and **Luisa Marie Velasco\***, University of Texas at Austin (1203-35-43746)

9:00AM (214.3) *Scattering theory for the Inhomogeneous Kinetic Wave Equation*  
**Ioakeim Ampatzoglou\***, CUNY Baruch College (1203-35-43948)

9:30AM (214.4) *Smoothing estimates of the Landau-Coulomb diffusion.*  
**Rene Cabrera\***, The University of Texas At Austin (1203-35-44404)

10:00AM (214.5) *Uniqueness Criteria for  $SH$ -solutions to the homogeneous Landau-Coulomb equation*  
**William Golding\***, University of Texas at Austin (1203-35-45408)

10:30AM (214.6) *Local well-posedness for the relativistic Landau equation*  
**Andrei Tarfulea\***, Louisiana State University and **Aynur Bulut**, Louisiana State University (1203-35-44245)

11:00AM (214.7) *Large-data theory for the relativistic Landau equation*  
**Stanley Snelson\***, Florida Institute of Technology, **Christopher Henderson**, University of Arizona, **Andrei Tarfulea**, Louisiana State University and **Maja Taskovic**, Emory University (1203-35-44972)

11:30AM (214.8) *On the effective dynamics of Bose-Fermi mixtures*  
**Esteban Cardenas**, The University of Texas at Austin, **Joseph Kentaro Miller**, Stanford University and **Natasa Pavlovic\***, The University of Texas at Austin (1203-35-44332)

**(215) AMS Special Session on Advances in Operator Algebras, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 201, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Ms. Priyanga Ganesan**, University of California San Diego  
**Changying Ding**, Vanderbilt University  
**Kathryn McCormick**, California State University, Long Beach

8:00AM (215.1) *Nuclear dimension of twisted groupoid  $C^*$ -algebras.*  
**Maria Grazia Viola\***, Lakehead University, **Astrid An Huef**, Victoria University. of Wellington, **Kristin Courtney**, University of Southern Denmark, **Anna Duwenig**, KU Leuven and **Magdalena Georgescu**, Independent researcher (1203-46-41492)

8:30AM (215.2) *HK-conjecture for certain groupoids constructed by Putnam*  
**Maggie Reardon\***, University of Colorado Boulder (1203-46-41649)

9:00AM (215.3) *Mackey embedding for reduced group  $C^*$ -algebras*  
**Pierre Clare**, College of William & Mary, **Nigel Higson**, The Pennsylvania State University and **Angel Roman-Martinez\***, Washington University in St Louis (1203-46-39498)

9:30AM (215.4) *Spectral triples on a non-standard presentation of Effros-Shen AF algebras*  
**Samantha Brooker\***, Virginia Tech (1203-46-44812)

10:00AM (215.5)  *$SL_p$ -Spectral Triples: Group and UHF Algebras*  
**Alonso Delfin Ares De Parga\***, University of Colorado, Boulder, **Carla Emilia Farsi**, University of Colorado Boulder and **Judith A. Packer**, University of Colorado, Boulder (1203-47-42319)

10:30AM (215.6) *Finitely Summable  $K$ -homology and Cantor Minimal Systems*  
**Levi Lorenzo\***, CU Boulder (1203-46-44036)

11:00AM (215.7) *Small scale geometry of operator spaces*  
**Javier Alejandro Chávez-Domínguez\***, University of Oklahoma and **Bruno M Braga**, IMPA (1203-47-43439)

**(216) AMS Special Session on Affine Algebraic Geometry and  $\mathbb{G}_a$ -Actions, II**

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FRIDAY, JANUARY 10 8:00AM–12:00PM 607, Level Six,  
Seattle Convention Center Arch at  
705 Pike

- Organizers: **Gene Freudenburg**, Western Michigan University  
**Neena Gupta**, Indian Statistical Institute
- 8:00AM (216.1) *The Rigid Affine Pham-Brieskorn Threefolds*  
**Michael Chitayat**<sup>\*</sup>, Chitayat Consulting Incorporated (1203-14-41673)
- 9:00AM (216.2) *Automorphisms of the ring of invariants of the binary quintic representation of  $SL_2(k)$*   
**Gene Freudenburg**<sup>\*</sup>, Western Michigan University and **Daniel Daigle**, University of Ottawa (Canada) (1203-14-42276)
- 10:00AM (216.3) *Some results on normal log canonical del Pezzo surfaces of Picard number one*  
**Hideo Kojima**<sup>\*</sup>, Niigata University (1203-14-41577)
- 11:00AM (216.4) *Cylindrical varieties and additive group actions*  
**Adrien Dubouloz**<sup>\*</sup>, CNRS - LMA Université de Poitiers (1203-14-45092)

**(217) AMS Special Session on AI for the Working Mathematician, I**

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FRIDAY, JANUARY 10 8:00AM–12:00PM Skagit 3, Lower  
Level, Seattle Convention Center  
Arch at 800 Pike

- Organizers: **Jordan S Ellenberg**, University of Wisconsin-Madison  
**Gunnar Carlsson**, Stanford University  
**Akshay Venkatesh**, Institute for Advanced Study
- 8:00AM (217.1) *Applications of AI to formal theorem proving*  
**Jason Rute**<sup>\*</sup>, IBM Research (1203-103-41272)
- 9:00AM (217.2) *Problems in AI and Machine Learning for Mathematicians*  
**Lev Reyzin**<sup>\*</sup>, University of Illinois at Chicago (1203-00-43849)
- 10:00AM (217.3) *Reinforcement learning and pattern finding in combinatorics*  
**Adam Zsolt Wagner**<sup>\*</sup>, Google DeepMind (1203-90-42552)
- 11:00AM (217.4) *AI4Crypto: Machine Learning attacks on Post-Quantum Cryptography*  
**Kristin E. Lauter**<sup>\*</sup>, Meta AI (1203-11-43327)

**(218) AMS Special Session on Algebraic Methods in Machine Learning and Optimization, I**

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FRIDAY, JANUARY 10 8:00AM–12:00PM Skagit 2, Lower  
Level, Seattle Convention Center  
Arch at 800 Pike

- Organizers: **Prof. Guido Francisco Montufar**, University of California, Los Angeles

**Yulia Alexandr**, University of California, Los Angeles

**Julia Lindberg**, University of Wisconsin-Madison, USA

**Jiayi Li**, University of California, Los Angeles

- 8:00AM *Introductory Remarks*
- 8:30AM (218.2) *On the Geometry and Optimization of Polynomial Convolutional Networks*  
**Giovanni Luca Marchetti**<sup>\*</sup>, KTH Royal Institute of Technology (1203-68-41877)
- 9:00AM (218.3) *Generalization and Optimization in Symmetry-Preserving Machine Learning: Sample Complexity and Implicit Bias*  
**Wei Zhu**<sup>\*</sup>, Georgia Institute of Technology (1203-68-40220)
- 9:30AM (218.4) *A transversality theorem for semi-algebraic sets*  
**Dan Edidin**<sup>\*</sup>, Department of Mathematics, University of Missouri, Columbia, MO 65211 (1203-14-42654)
- 10:00AM (218.5) *Decomposing Tensors via Rank-one Approximations*  
**Emil Horobet**, Sapientia Hungarian University of Transylvania, **Alvaro Ribot**<sup>\*</sup>, Harvard University, **Anna Seigal**, Harvard University and **Ettore Teixeira Turatti**, UiT The Arctic University of Norway (1203-15-43536)
- 10:30AM (218.6) *The geometry of loss functions in machine learning*  
**Yaim Cooper**<sup>\*</sup>, University of Notre Dame (1203-51-44560)
- 11:00AM (218.7) *Adversarially Robust Neural Network Decision Boundaries via Tropical Geometry*  
**Kurt Pasque**, Naval Postgraduate School, Monterey, CA, **Christopher Teska**<sup>\*</sup>, Naval Postgraduate School, Monterey, CA, **Ruriko Yoshida**, Naval Postgraduate School, Monterey, CA, **Keiji Miura**, Kwansei Gakuin University, Sanda, Japan and **Jefferson Huang**, Naval Postgraduate School, Monterey, CA (1203-14-43606)
- 11:30AM (218.8) *On functional dimension and persistent pseudodimension*  
**Julia Elisenda Grigsby**<sup>\*</sup>, Boston College and **Kathryn Anne Lindsey**, Boston College (1203-68-43699)

**(219) AMS Special Session on Algorithmic Approaches for Promoting Fairness in ML, I**

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FRIDAY, JANUARY 10 8:00AM–12:00PM 606, Level Six,  
Seattle Convention Center Arch at  
705 Pike

- Organizers: **Anna Ma**, University of California, Irvine  
**Lara Kassab**, University of California, Los Angeles
- 8:00AM (219.1) *The Intersectionality Problem for Algorithmic Fairness*  
**Johannes Himmelreich**, Syracuse University, **Arbie Hsu**, University of San Francisco,

**Kristian Lum**, The University of Chicago and **Ellen Veomett**, University of San Francisco (1203-62-40626)

8:30AM  
▶ (219.2) *Evaluating quantitative predictive models for genocide resilience*  
**Manuchehr Aminian**, Cal Poly Pomona, **Jose Luis Pabon**, New Jersey Institute of Technology, **Victor Piercey**, Ferris State University, **Ashley Greene**, Keene State College and **Kevin Bales**, University of Nottingham (1203-62-41162)

9:00AM  
▶ ◆ (219.3) *Empirical Power Analysis of a Statistical Test to Quantify Gerrymandering*  
**Ranthonny A Clark**, The Ohio State University, Duke University, **Susan Glenn**, Los Alamos National Laboratory, **Harlin Lee**, University of North Carolina at Chapel Hill and **Soledad Villar**, Johns Hopkins University (1203-62-45398)

9:30AM  
▶ ◆ (219.4) *Observational Multiplicity and Regret*  
**Erin George**, University of California, Los Angeles (1203-68-44905)

10:00AM  
▶ ◆ (219.5) *The Mathematics of Mathematics (#MetaMath): An Introduction and Some Examples*  
**Omayra Ortega**, Sonoma State University, **Ron Buckmire**, Occidental College, **Carrie Diaz Eaton**, Bates College, **Joseph Edward Hibdon**, Northeastern Illinois University, **Jakini Kauba**, Clemson University, **Drew Lewis**, Unaffiliated, **Jose Luis Pabon**, New Jersey Institute of Technology, **Rachel Roca**, Michigan State University, **Andres R. Vindas-Melendez**, Harvey Mudd College and **Sam Zhang**, University of Colorado Boulder (1203-104-44807)

11:00AM  
▶ (219.6) *Towards a Fairer Non-Negative Matrix Factorization*  
**Haowen Geng**, University of California, Los Angeles, **Erin George**, University of California, Los Angeles, **Nika Jafar Nia**, Amherst College, **Lara Kassab**, University of California, Los Angeles, **Aoxi Li**, University of California, Los Angeles and **Deanna Needell**, University of California, Los Angeles (1203-68-45189)

11:30AM  
▶ (219.7) *Fairness, Accuracy, and Unreliable Data*  
**Kevin Stangl**, TTIC (1203-68-45769)

### ***(220) AMS Special Session on Data Fusion Methods, Modeling, and Applications, I***

FRIDAY, JANUARY 10 8:00AM–12:00PM Yakima 2, Level 1, Seattle Convention Center Arch at 800 Pike

Organizer: **Stephanie Allen**, Johns Hopkins University Applied Physics Laboratory

8:00AM  
(220.1) *Exploring artificial intelligence for practical data assimilation and prediction problems*  
**Kayo Ide**, University of Maryland (1203-104-44584)

9:00AM  
▶ ◆ (220.2) *Optimizing Resources to Track Moving Objects*  
**Janiah Kyle**, Johns Hopkins Applied Physics Laboratory (1203-03-42126)

9:30AM  
▶ (220.3) *A Methodology for Dependent Data Fusion*  
**Michael Peretzian Williams**, Johns Hopkins University Applied Physics Laboratory and **Alexander V Michos**, Johns Hopkins Applied Physics Laboratory (1203-62-41138)

10:00AM  
▶ (220.4) *Information Intersection a Fusion Methodology for Dependent Data*  
**Michael Peretzian Williams**, Johns Hopkins University Applied Physics Laboratory and **Sofia N Taylor**, Johns Hopkins University (1203-62-40443)

10:30AM  
▶ (220.5) *Breast Cancer Detection with Upstream Data Fusion, Machine Learning, and Automated Registration*  
**Michael Peretzian Williams**, Johns Hopkins University Applied Physics Laboratory (1203-62-42132)

### ***(221) AMS Special Session on Descriptive Combinatorics, Dynamics, and Measured Group Theory, I***

FRIDAY, JANUARY 10 8:00AM–12:00PM 605, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Ran Tao**, Carnegie Mellon University  
**Joshua Frisch**, University of California San Diego  
**Michael Wolman**, Caltech

8:00AM  
▶ (221.1) *Matchings in descriptive combinatorics*  
**Clinton Taylor Conley**, Carnegie Mellon University (1203-03-45139)

9:00AM  
(221.2) *Cayley spherical Polish groups*  
**Christian Rosendal**, University of Maryland, College Park and **Jenna Zomback**, University of Maryland, College Park (1203-03-41465)

10:00AM  
◆ (221.3) *Eigenvalues and the stabilized automorphism group of minimal systems*  
**Jennifer N. Jones-Baro**, Northwestern University (1203-37-41703)

10:30AM  
◆ (221.4) *Automorphisms of Minimal Shifts*  
**Kimberly Golubeva**, Caltech (1203-37-43680)

11:00AM  
(221.5) *Asymptotic power laws*  
**Gil Goffer**, University of California at San Diego (1203-20-44015)

### ***(222) AMS Special Session on Dynamic Horizons in Mathematical Biology and Ecology: Current Insights and Future Prospects, I***

FRIDAY, JANUARY 10 8:00AM–12:00PM Skagit 5, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Prof. Gail SK Wolkowicz**, PhD, McMaster University  
**Gunog Seo**, Colgate University

**Kunquan Lan**, Toronto Metropolitan University

- 8:00AM  
▶ (222.1) *Modeling the distribution of fitness effects of new mutations*  
**Troy Day**<sup>\*</sup>, Queen's University (1203-92-39613)
- 8:30AM  
▶ (222.2) *Understanding transient crawl-bys in ecological timeseries.*  
**Chris M. Heggerud**<sup>\*</sup>, University of California, Davis (1203-92-39378)
- 9:00AM  
(222.3) *Toxin-Driven Population Dynamics and Bifurcations in Aquatic Ecosystems*  
**Gunog Seo**<sup>\*</sup>, Colgate University, **Qihua Huang**, Southwest University, Chongqing, China and **Chunhua Shan**, The University of Toledo (1203-92-45276)
- 9:30AM  
▶ ◆ (222.4) *Utilizing Generalized Inverse to Quantify Heterogeneity in Population Dynamics*  
**Zhisheng Shuai**<sup>\*</sup>, University of Central Florida (1203-92-45536)
- 10:00AM  
▶ (222.5) *On Nicholson's blowflies differential equations with a small delay in the mortality term*  
**Elena Braverman**<sup>\*</sup>, University of Calgary (1203-34-39406)
- 10:30AM  
▶ (222.6) *Derivation and dynamics of discrete population models with distributed delay in reproduction*  
**Sabrina H Streipert**<sup>\*</sup>, University of Pittsburgh and **Prof. Gail SK Wolkowicz, PhD**, McMaster University (1203-39-44019)
- 11:00AM  
(222.7) *Evolutionary Stability of Bacterial Persister Cells*  
**Chongming Li**<sup>\*</sup>, Queen's University (1203-92-41841)
- 11:30AM  
▶ (222.8) *Discrete fractional Gompertz models*  
**Tom Cuchta**<sup>\*</sup>, Marshall University and **Rebecca Oduro**, Marshall University (1203-39-44403)

**(223) AMS Special Session on Geometric PDE and Mathematical Physics, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 614, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Guofang Wei**, UC Santa Barbara

**Eric Woolgar**, University of Alberta  
**Erin Griffin**, Northwestern University  
**Eric Bahuaud**, Seattle University  
**Eric Bahuaud**, Seattle University

- 8:00AM  
(223.1) *Existence Criteria for Compact Homogeneous Einstein Metrics*  
**Megan M Kerr**<sup>\*</sup>, Wellesley College, **Isabel Beach**, University of Toronto, **Haydee Contreras Peruyero**, UNAM-Morelia, **Erin Griffin**, Northwestern University, **Regina Rotman**, University of Toronto and **Catherine Searle**, Wichita State University (1203-53-43557)
- 8:30AM  
◆ (223.2) *Almost non-negatively curved 5-manifolds with torus symmetry*  
**Catherine Searle**<sup>\*</sup>, Wichita State University, **Samuel Bartel**, Oregon State University and

**John M Harvey**, Cardiff University (1203-53-42292)

- 9:00AM  
(223.3) *Positive curvature and discrete torus actions*  
**Austin Roy Bosgraaf**, Oregon State University, **Christine M. Escher**<sup>\*</sup>, Oregon State University and **Catherine Searle**, Wichita State University (1203-53-39358)
- 9:30AM  
*Break*
- 10:00AM  
(223.5) *The Conformal Case of the Scalar Compactness Conjecture*  
**Brian Allen**<sup>\*</sup>, Lehman College, CUNY, **Wenchuan Tian**, UC Santa Barbara and **Changliang Wang**, Tongji University (1203-53-40415)
- 10:30AM  
(223.6) *Convergence of discrete conformal mappings of surfaces*  
**David A. Glickenstein**<sup>\*</sup>, University of Arizona (1203-53-44024)
- 11:00AM  
(223.7) *Conformally covariant polydifferential operators*  
**Jeffrey S. Case**<sup>\*</sup>, Penn State University (1203-58-41860)
- 11:30AM  
(223.8) *Expanding Ricci solitons in dimension four*  
**Matthias Wink**<sup>\*</sup>, University of California, Santa Barbara (1203-53-40161)

**(224) AMS Special Session on Homotopy Theory, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 617, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Morgan Peck Opie**, UCLA  
**Piotr Pstragowski**, Harvard University  
**Kirsten Wickelgren**, Duke University  
**XiaoLin Danny Shi**, University of Washington

- 8:00AM  
▶ (224.1)  *$\mathbb{E}_n$ -algebras in  $\mathcal{M}$ -categories*  
**Yu Liu**<sup>\*</sup>, Harvard University (1203-55-43410)
- 8:30AM  
(224.2) *A synthetic approach for differentials in equivariant slice spectral sequences*  
**Yuchen Wu**<sup>\*</sup>, University of California San Diego (1203-55-44473)
- 9:00AM  
(224.3) *Algebraic geometry of Tambara functors*  
**David Chan**, Michigan State University, **David Mehrle**, University of Kentucky, **J.D. Quigley**, University of Virginia, **Ben Spitz**, University of Virginia and **Danika Van Niel**<sup>\*</sup>, Michigan State University (1203-55-44156)
- 9:30AM  
▶ (224.4) *Applications of Equivariant Homotopy Theory to the Mapping Class Groups of Some 4-Manifolds*  
**Scott Tilton**<sup>\*</sup>, UCSD (1203-55-44246)
- 10:00AM  
▶ ◆ (224.5) *Classifying fields in  $\mathcal{S}_{\mathbb{C}\{p^n\}}$ -equivariant algebra*  
**Noah Wisdom**<sup>\*</sup>, Northwestern University (1203-55-43115)
- 10:30AM  
(224.6) *Computations with motivic spectral sequence for THH*  
**David Lee**<sup>\*</sup>, MIT (1203-55-43944)

- 11:00AM *Modeling Equivariant Simplicial Sets with  
Simplicial Coalgebras*  
◆ (224.7) **Sofia Rose Martinez Alberga**<sup>\*</sup>, Purdue University and **Manuel Rivera**, Purdue University (1203-55-43373)
- 11:30AM *Equivariant Dyer-Lashof Operations*  
(224.8) **Prasit Bhattacharya**, New Mexico State University and **Alexander Waugh**<sup>\*</sup>, University of Washington (1203-55-44341)

**(225) AMS Special Session on Mathematic of Decisions, Elections, and Games, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM Tahoma 2, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Michael A. Jones**, Mathematical Reviews | AMS  
**David McCune**, William Jewell College  
**Jennifer M. Wilson**, Eugene Lang College, New School University

- 8:00AM *Ahead of the Count: Probabilistic Prediction of Instant Runoff (IRV) Elections*  
▶ (225.1) **P. Christopher Staecker**<sup>\*</sup>, Fairfield University and **Nicholas Kapoor**, Fairfield University (1203-62-40123)
- 8:30AM *Top-Two Runoff Elections (Uniquely) Dominate Plurality Rule*  
▶ (225.2) **Nathan Atkinson**<sup>\*</sup>, University of Wisconsin and **Ezra Friedman**, Northwestern (1203-91-43978)
- 9:00AM *Strategy-proof and Neutral Social Choice Functions on the Condorcet Domain*  
▶ (225.3) **Flannery Wells**<sup>\*</sup>, Bellarmine University and **Robert Powers**, University of Louisville (1203-91-44147)
- 9:30AM *Hypergraph models for coalition structures*  
(225.4) **Ismar Volic**<sup>\*</sup>, Wellesley College and **Zixu Wang**, University of Notre Dame (1203-91-40526)
- 10:00AM *New fairness criteria for truncated ballots in multi-winner ranked-choice elections*  
▶ (225.5) **Matthew I Jones**<sup>\*</sup>, Yale University, College of the Holy Cross, **Adam Graham-Squire**, High Point University and **David McCune**, William Jewell College (1203-91-38575)
- 10:30AM *Single Transferable Vote and Paradoxes of Negative and Positive Involvement*  
▶ (225.6) **David McCune**<sup>\*</sup>, William Jewell College (1203-91-38003)
- 11:00AM *Exclusion Zones in Instant Runoff Elections*  
▶ (225.7) **Kiran Tomlinson**<sup>\*</sup>, Microsoft Research (1203-91-39055)
- 11:30AM *Mend the gap: A smart repair algorithm for noisy polygonal tilings*  
▶ (225.8) **Jeanne Clelland**<sup>\*</sup>, University of Colorado Boulder (1203-68-41972)

**(226) AMS Special Session on Mathematical Quantum Chaos, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 612, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Semyon Dyatlov**, Massachusetts Institute of Technology  
**Maciej Zworski**, University of California, Berkeley

- 8:00AM *The Ten Martini problem in the semiclassical limit*  
(226.1) **Simon Becker**<sup>\*</sup>, ETH Zürich (1203-47-39850)
- 9:00AM *Scattering theory of the Aharonov-Bohm Hamiltonian with multiple poles*  
▶ (226.2) **Mengxuan Yang**<sup>\*</sup>, University of California, Berkeley (1203-35-41076)
- 10:00AM *Global-function representations for wave scattering and eigenvalue problems*  
▶ (226.3) **Oscar P Bruno**<sup>\*</sup>, Caltech (1203-65-44177)
- 11:00AM *Ruling out periodicity in quantum chaos*  
(226.4) **Alexander Cohen**<sup>\*</sup>, MIT and **Semyon Dyatlov**, Massachusetts Institute of Technology (1203-35-40355)

**(227) AMS Special Session on Mathematics Informed by Computing, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 613, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Eran Assaf**, Dartmouth  
**David L Roe**, Massachusetts Institute Technology  
**Christelle Vincent**, University of Vermont  
**David Lowry-Duda**, ICERM & Brown University  
**David Lowry-Duda**, ICERM & Brown University

- 8:00AM *\textsc{Penrose}: from mathematical notation to beautiful diagrams*  
▶ (227.1) **Wode Ni**<sup>\*</sup>, Carnegie Mellon University (1203-68-44670)
- 8:30AM *Theorems inspired by computer generated art*  
▶ ◆ (227.2) **Gabriel Dorfsman-Hopkins**<sup>\*</sup>, St. Lawrence University (1203-11-41647)
- 9:00AM *Patterns in the landscapes of L-functions*  
(227.3) **David W. Farmer**, American Institute of Mathematics, **Sally Koutsoliotas**<sup>\*</sup>, Bucknell University, **Stefan Lemurell**, Chalmers University of Technology and University of Gothenburg and **David P. Roberts**, University of Minnesota, Morris (1203-11-43678)
- 9:30AM *Models of modular curves*  
(227.4) **David Zywna**<sup>\*</sup>, Cornell University (1203-11-44152)
- 10:00AM *Shimura curves, gonality, and low-degree points*  
(227.5) **Frederick Saia**<sup>\*</sup>, University of Illinois Chicago and **Oana Padurariu**, Max-Planck-Institut für Mathematik (1203-11-45050)

- 10:30AM (227.6) *Weierstrass points on Shimura curves*  
**Holly Paige Chaos**<sup>\*</sup>, University of Vermont (1203-14-43970)
- 11:00AM (227.7) *Murmurations of Dirichlet characters*  
**Kyu-Hwan Lee**<sup>\*</sup>, University of Connecticut, **Thomas Oliver**<sup>\*</sup>, University of Westminster and **Alexey Pozdnyakov**<sup>\*</sup>, Princeton University (1203-11-42879)
- 11:30AM (227.8) *The least prime in the Chebotarev density theorem*  
**Robert James Lemke Oliver**<sup>\*</sup>, Tufts University (1203-11-45230)

***(228) AMS Special Session on Mathematics of Topological Insulators, I***

FRIDAY, JANUARY 10 8:00AM–12:00PM Yakima 1, Level 1, Seattle Convention Center Arch at 800 Pike

- Organizers: **Xiaowen Zhu**, University of Washington  
**Alexis Drouot**, University of Washington  
**Matthew H Faust**, Texas A&M University
- 8:00AM ▶ (228.1) *Fractional indices and Hall conductance*  
**Guo Chuan Thiang**<sup>\*</sup>, Peking University, Beijing International Center for Mathematical Research (1203-47-39747)
- 8:30AM (228.2) *Asymmetric interface transport and validity or not of the bulk-edge correspondence*  
**Guillaume Bal**<sup>\*</sup>, University of Chicago (1203-35-41732)
- 9:00AM (228.3) *A bulk  $\mathbb{Z}_2$  index of time-reversal invariant phases*  
**Sven Bachmann**<sup>\*</sup>, The University of British Columbia (1203-81-39917)
- 9:30AM *Break*
- 10:00AM ▶ (228.5) *Local topological classification of open and nonlinear materials*  
**Alexander Cerjan**<sup>\*</sup>, Sandia National Laboratories (1203-78-42372)
- 10:30AM ▶ (228.6) *The Loring--Schulz-Baldes Spectral Localizer Revisited*  
**Jacob Shapiro**<sup>\*</sup>, Princeton University (1203-81-39788)
- 11:00AM (228.7) *The Critical Point Degree of a Bloch Variety*  
**Frank Sottile**<sup>\*</sup>, Texas A&M University, **Matthew H Faust**, Michigan State University and **Jonah Ray Robinson**, Texas A&M University (1203-81-39796)
- 11:30AM (228.8) *The Charge Gap exceeds ( $\geq$ ) the Neutral Gap*  
**Marius Lemm**, University of Tuebingen, **Bruno Nachtergaele**<sup>\*</sup>, University of California, Davis, **Simone Warzel**, Technical University Munich and **Amanda Young**, University of Illinois Urbana-Champaign (1203-82-43656)

***(229) AMS Special Session on Methods of Compassionate Math I***

FRIDAY, JANUARY 10 8:00AM–12:00PM Chelan 5, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Theodore V Theodosopoulos**, Nueva School  
**Paul Dancstep**, Topos Institute  
**Nathan Haydon**, University of Waterloo  
**Priyaa Varshinee Srinivasan**, Topos Institute

- 8:00AM ▶ (229.1) *Teaching as if Students Mattered: An Exploration of the Boundaries of Humanistic and Compassionate Mathematics*  
**Dr. Gizem Karaali**<sup>\*</sup>, Pomona College (1203-101-44468)
- 8:30AM (229.2) *Multivariable Calculus with Compassionate Instruction and Assessment*  
**Jennifer Royal**<sup>\*</sup>, University of Georgia (1203-101-44876)
- 9:00AM ▶ (229.3) *Immersive Theatre, Interactive Fiction, and Multivariable Calculus*  
**Andrew M H Alexander**<sup>\*</sup>, The Nueva School (1203-101-43862)
- 9:30AM *Discussion 1*
- 10:00AM ▶ (229.5) *Play from the start, art as a tool for mathematics research*  
**Edmund O. Harriss**<sup>\*</sup>, University of Arkansas (1203-97-40299)
- 10:30AM ▶ (229.6) *On mathematical illustration*  
**Katherine E. Stange**<sup>\*</sup>, University of Colorado, Boulder (1203-11-40369)
- 11:00AM ▶ (229.7) *Bridging teaching and research: compassionate math in the classroom*  
**Theodore V Theodosopoulos**<sup>\*</sup>, Nueva School (1203-101-44145)
- 11:30AM *Discussion 2*

***(230) AMS Special Session on Modeling and Optimization on Graph-Structured Data, I***

FRIDAY, JANUARY 10 8:00AM–11:00AM 203, Level Two, Seattle Convention Center Arch at 705 Pike

- Organizers: **Weihong Guo**, Case Western Reserve University  
**Yifei Lou**, University of North Carolina at Chapel Hill  
**Jing Qin**, University of Kentucky
- 8:00AM ▶ (230.1) *Bayesian Spatial Transcriptomic Data Deconvolution using Graph Laplacian Prior*  
**Weihong Guo**, Case Western Reserve University and **Jiasen Zhang**<sup>\*</sup>, Case Western Reserve University (1203-49-44988)
- 8:30AM (230.2) *Community-Size Biases in Statistical Inference in Temporal Networks*  
**Theodore Yushin Faust**<sup>\*</sup>, UCLA and **Mason A Porter**, UCLA (1203-62-39221)
- 9:00AM ▶ (230.3) *MALADY: Multistage Active Learning with Auction Dynamics on Graphs*

**Ekaterina Rapinchuk**<sup>\*</sup>, Michigan State University, **Gokul Bhusal**, Michigan State University and **Kevin Miller**, Brigham Young University (1203-68-39513)

9:30AM  
▶ (230.4) *Group-Node Attention for Community Evolution Prediction*  
**Matthew Revelle**<sup>\*</sup>, Montana State University (1203-68-40831)

10:00AM  
▶ ◆ (230.5) *Hyperspectral Band Selection Based on Matrix CUR Decomposition*  
**Katherine Jean Henneberger**<sup>\*</sup>, University of Kentucky and **Jing Qin**, University of Kentucky (1203-65-41212)

10:30AM  
▶ ◆ (230.6) *Linear independent component analysis in Wasserstein space*  
**Shiyang Li**<sup>\*</sup>, University of North Carolina, Chapel Hill, **Caroline Moosmueller**, University of North Carolina at Chapel Hill and **Chuxiangbo Wang**, University of North Carolina at Chapel Hill (1203-68-43132)

**(231) AMS Special Session on New Developments in Noncommutative Algebra, I**

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FRIDAY, JANUARY 10 8:00AM–12:00PM 602, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Ellen E Kirkman**, Wake Forest University  
**James Jian Zhang**, University of Washington  
**Robert Won**, George Washington University

8:00AM  
(231.1) *On the Hochschild Cohomology for Frobenius Kernels*  
**Tekin Karadag**, University of Georgia and **Daniel K Nakano**<sup>\*</sup>, University of Georgia (1203-17-41901)

8:30AM  
(231.2) *Classifying localizing subcategories for Lie superalgebra representations*  
**Matthew Hamil**<sup>\*</sup>, University of Georgia (1203-17-44811)

9:00AM  
(231.3) *Cohomology of truncated Ore extensions*  
**Sarah J. Witherspoon**<sup>\*</sup>, Texas A&M University (1203-16-40906)

9:30AM  
(231.4) *The Herzog-Takayama resolution over a skew polynomial ring*  
**Luigi Ferraro**<sup>\*</sup>, University of Texas Rio Grande Valley and **Linoy Utkina**, University of Texas Rio Grande Valley (1203-16-42465)

10:00AM  
(231.5) *Structures of Hopf algebras of dimension  $p^2$  in characteristic  $p$*   
**Xingting Wang**<sup>\*</sup>, Louisiana State University (1203-16-40681)

10:30AM  
▶ (231.6) *Extensions of  $p$ -dimensional Hopf algebras in characteristic  $p$*   
**Siu-Hung Ng**<sup>\*</sup>, Louisiana State University (1203-16-43178)

11:00AM  
(231.7) *Taft actions on preprojective algebras*  
**Amrei Oswald**<sup>\*</sup>, University of Washington and **Jason Gaddis**, Miami University (1203-16-44689)

11:30AM  
◆ (231.8) *Generalizing (hyper)rings to include  $\mathbb{F}_1$*   
**So Nakamura**, UC Irvine and **Manuel L. Reyes**<sup>\*</sup>, UC Irvine (1203-16-43598)

**(232) AMS Special Session on Recent Advances in Potential Theory and Partial Differential Equations, I**

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FRIDAY, JANUARY 10 8:00AM–12:00PM 213, Level Two, Seattle Convention Center Arch at 705 Pike

Organizer: **Ugur G. Abdulla**, Department of Mathematical Sciences, Florida Institute of Technology

8:00AM  
(232.1) *Superposition principle in disjoint variables and applications.*  
**Juan J Manfredi**<sup>\*</sup>, University of Pittsburgh, **Qing Liu**, Okinawa Institute of Science and Technology and **Xiaodan Zhou**, Okinawa Institute of Science and Technology (1203-35-40160)

9:00AM  
(232.2) *Schrödinger semigroups and the Hörmander finite-rank condition*  
**Nicola Garofalo**<sup>\*</sup>, School of Mathematical and Statistical Sciences, Arizona State University (1203-35-43331)

10:00AM  
(232.3) *Schrodinger evolutions for variable coefficient non-local operators*  
**Carlos E Kenig**<sup>\*</sup>, University of Chicago (1203-35-42389)

11:00AM  
(232.4) *Kolmogorov Problem and Wiener-type Criteria for the Removability of the Fundamental Singularity for the Elliptic and Parabolic PDEs*  
**Ugur G. Abdulla**<sup>\*</sup>, Analysis and PDE Unit, Okinawa Institute of Science and Technology (1203-35-40003)

**(233) AMS Special Session on Rethinking Number Theory: Highlighting the Research and Discussions of the RNT Workshops, I**

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FRIDAY, JANUARY 10 8:00AM–12:00PM 604, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Sarah Arpin**, University of Colorado Boulder  
**Henry Chimal-Dzul**, University of Notre Dame  
**Heidi Goodson**, Brooklyn College, City University of New York  
**Shanna Dobson**, California State University, Los Angeles

8:00AM  
◆ (233.1) *Zeros of the derivatives of L-functions attached to Maass forms*  
**Amita Malik**<sup>\*</sup>, Penn State (1203-11-44225)

8:30AM  
▶ ◆ (233.2) *Automorphic forms and string scattering amplitudes*  
**Maryam Khaqan**<sup>\*</sup>, University of Toronto, **Kim Klinger-Logan**, Kansas State University, **Manish Kumar Pandey**, SRM University AP, India and **Holley Friedlander**, Dickinson College (1203-11-42990)

- 9:00AM (233.3) *Gamma factors in a modular setting*  
**Ashwin Iyengar**<sup>\*</sup>, Johns Hopkins University, **Heidi Goodson**, Brooklyn College, City University of New York, **Jacksyn Bakeberg**, McGill University, **Robin Zhang**, MIT, **Mathilde Gerbelli-Gauthier**, Institute for Advanced Study and **Gilbert Moss**, University of Maine (1203-11-44456)
- 9:30AM (233.4) *On the  $p$ -ranks of Class Groups of Certain Galois Extensions*  
**Enrique Nuñez Lon-wo**<sup>\*</sup>, University of Toronto, **Ufoma Asarhasa**, Penn State University, **Rusiru Gambheera**, University of California, Santa Barbara, **Debanjana Kundu**, University of Texas - Rio Grande Valley and **Arshay Sheth**, University of Warwick (1203-11-42689)
- 10:00AM (233.5) *A  $p$ -adic analytic Brauer group*  
**Deewang Bhamidipati**<sup>\*</sup>, UC Santa Cruz (1203-11-41852)
- 10:30AM (233.6) *Special Factors in Zeta Functions of Hypergeometric Pencils*  
**Leah Sturman**<sup>\*</sup>, Southern Connecticut State University, **Rachel Davis**, University of Wisconsin-Madison, **Jessamyn Dukes**, Rutgers, **Eli Orvis**, University of Colorado, Boulder, **Thais Gomes Ribeiro**, University of Birmingham, **Adriana Salerno**, National Science Foundation and **Ursula Whitcher**, Mathematical Reviews (AMS) (1203-11-43655)
- 11:00AM (233.7) *Pomona Research in Mathematics Experience (PRiME): Reflections on a Research Learning Community*  
**Edray Herber Goins**<sup>\*</sup>, Pomona College (1203-103-42441)

**(234) AMS Special Session on Spectral Theory of Ergodic Operators and Related Models, III**

FRIDAY, JANUARY 10 8:00AM–12:00PM 608, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Svetlana Jitomirskaya**, University of California, Berkeley

**Netanel Levi**, UC Irvine

**Matthew Powell**, Georgia Institute of Technology

**Matthew Powell**, Georgia Institute of Technology

8:00AM (234.1) *Statistics of magnetic flows of surfaces with negative curvature*

**Boris Hasselblatt**, Tufts University and **JinCheng Wang**<sup>\*</sup>, Tufts University (1203-37-43742)

8:30AM (234.2) *A bound for the eigenvalue counting function for Krein–von Neumann and Friedrichs extensions of elliptic operators*

**Selim Sukhtaiev**<sup>\*</sup>, Auburn University (1203-35-44977)

9:00AM (234.3) *Uniform Estimates for Random Walks on Linear Groups and Applications*

**Omar Hurtado**<sup>\*</sup>, University of California, Irvine and **Sidhanth Raman**, University of California, Irvine (1203-37-41060)

9:30AM *Break*

10:00AM (234.5) *Geometric Borg's Theorem in arbitrary dimensions*

**Wencai Liu**<sup>\*</sup>, Texas A&M University (1203-14-39168)

10:30AM (234.6) *High-dimensional Fourier quasicrystals via Lee-Yang algebraic varieties*

**Lior Alon**<sup>\*</sup>, MIT (1203-81-42174)

11:00AM (234.7) *Twisted Bilayer Graphene in Commensurate Angles*

**Tal Malinovitch**<sup>\*</sup>, Rice University (1203-81-41671)

11:30AM (234.8) *Quasiperiodic operators with monotone potentials*

**Ilya Kachkovskiy**<sup>\*</sup>, Michigan State University (1203-47-43936)

**(235) AMS Special Session on The Euler Water Wave Problem, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 210, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Eleanor Devin Byrnes**, University of Washington

**Bernard Deconinck**, University of Washington

8:00AM (235.1) *The instabilities of near-extreme surface waves*

**Bernard Deconinck**<sup>\*</sup>, University of Washington (1203-76-39685)

8:30AM (235.2) *Weak Turbulence of Water Waves*

**Sergey A Dyachenko**<sup>\*</sup>, University at Buffalo (1203-76-44249)

9:00AM (235.3) *Long surface ring waves and their relatives*

**Karima Khusnutdinova**<sup>\*</sup>, LOUGHBOROUGH UNIVERSITY (1203-76-43324)

9:30AM (235.4) *Infinitely many isolas of modulational instability for Stokes waves*

**Paolo Ventura**<sup>\*</sup>, Università degli Studi di Milano (1203-35-41085)

10:00AM (235.5) *The effect of vorticity and elasticity on the stability of travelling waves*

**Emilian I. Parau**<sup>\*</sup>, University of East Anglia, United Kingdom and **Mark Blyth**, University of East Anglia, United Kingdom (1203-76-41264)

10:30AM (235.6) *Transverse Instability of Stokes Waves*

**Ryan P Creedon**<sup>\*</sup>, Brown University, **Huy Quang Nguyen**, University of Maryland, College Park and **Walter A Strauss**, Brown University (1203-76-43556)

11:00AM (235.7) *The Instabilities of 2-D Periodic Traveling Water Waves*

**Levent Adil Batakci**<sup>\*</sup>, University of Washington, **Bernard Deconinck**, University of Washington and **David P. Nicholls**, University of Illinois at Chicago (1203-76-40027)

11:30AM *Power series solution for standing water waves*  
 ◆ (235.8) **Vera Mikyong Hur**<sup>\*</sup>, University of Illinois Urbana-Champaign, **Savana Ammons**, University of Illinois Urbana-Champaign and **Blake Barker**, Brigham Young University (1203-76-44960)

**(236) AMS Special Session on Topology and Geometry Aspect of Deep Learning, I**

FRIDAY, JANUARY 10 8:00AM–11:30AM **Tahoma 1, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Yen-lung Tsai**, National Chengchi University  
**Tse-Yu Lin**, National Taiwan University

8:00AM *Topology-Enhanced Deep Learning Architectures: Applications in Image and Molecular Data*  
 ► (236.1) **Chuan-Shen Hu**<sup>\*</sup>, Nanyang Technological University (1203-68-43609)

8:30AM *Class of Generalizing ReLU activation function: Tropical Approach*  
 ► ◆ (236.2) **Tse-Yu Lin**<sup>\*</sup>, National Taiwan University and **Yen-lung Tsai**, National Chengchi University (1203-104-43377)

9:00AM *Nonintrusive load monitoring: a geometric and topology approach*  
 ► (236.3) **Sheng-Chi Shih**<sup>\*</sup>, Energy Track Flexco (1203-00-43301)

9:30AM *Break*

10:00AM *Asymptotic Expansion of Gradient Systems*  
 (236.5) **Jui-Yun Hung**<sup>\*</sup>, University of Notre Dame, Department of Mathematics (1203-34-41960)

11:00AM *Discussion*

**(237) AWM Special Session on AWM Purdue Chapter: Over a Decade of Empowering Women in Math, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM **4C-1, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizers: **Daniel Tolosa**, Purdue University  
**Asini Anuradhika Konpola**, Purdue University  
**Yiran Wang**, Purdue University  
**Sofia Rose Martinez Alberga**, Purdue University

8:00AM *ResSR: A Residual Approach to Super-Resolving Multispectral Images*  
 ► ◆ (237.1) **Haley Duba-Sullivan**<sup>\*</sup>, Purdue University, Oak Ridge National Laboratory, **Emma J. Reid**, Oak Ridge National Laboratory, **Sophie Voisin**, Oak Ridge National Laboratory, **Gregery T. Buzzard**, Purdue University and **Charles A. Bouman**, Purdue University (1203-68-38162)

8:30AM *A Spatial Agent-Based Model for Mosquito Dispersal*  
 ► ◆ (237.2)

**Lidia Mrad**<sup>\*</sup>, Mount Holyoke College and **Joceline C Lega**, University of Arizona (1203-92-44643)

9:00AM *What do picanha dishes have to do with differential equations?*  
 ► ◆ (237.3) **Mariana Smit Vega Garcia**<sup>\*</sup>, Western Washington University (1203-35-41898)

10:00AM *Regularity results for a penalized thin obstacle problem with variable coefficients.*  
 (237.4) **Donatella Danielli**<sup>\*</sup>, Arizona State University and **Brian Krummel**, The University of Melbourne (1203-35-43102)

11:00AM *HIV, geographic inequalities, and medical deserts*  
 ► ◆ (237.5) **Joan Ponce**<sup>\*</sup>, UCLA, **Justin Okano**, University of California, Los Angeles and **Sally Blower**, University of California, Los Angeles (1203-92-45375)

11:30AM *AWM Purdue Affiliates and Alumni Networking Session*  
 ► ◆ (237.6) **Daniel Tolosa**<sup>\*</sup>, Purdue University, **Sofia Rose Martinez Alberga**, Purdue University, **Asini Anuradhika Konpola**, Purdue University and **Yiran Wang**, Purdue University (1203-103-43471)

**Employment Center**

FRIDAY, JANUARY 10 8:00AM–5:30PM **Grand Ballroom AB, Second Floor, Sheraton Grand Seattle**

Organizers: **Kayla M. Roach**, American Mathematical Society  
**Hannah Ortiz**, American Mathematical Society

**(238) ILAS Special Session on 05C50 Offline, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM **204, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Stephen Kirkland**, University of Manitoba  
**Hermie Monterde**, University of Manitoba  
**Hermie Monterde**, University of Manitoba  
**Stephen Kirkland**, University of Manitoba

8:00AM *Maximum spread of graphs*  
 (238.1) **Jane Breen**<sup>\*</sup>, Ontario Tech University (1203-05-44195)

8:30AM *Limit points of the smallest positive eigenvalues of graphs*  
 (238.2) **Sasmita Barik**<sup>\*</sup>, Indian Institute of Technology Bhubaneswar and **Debabrota Mondal**, Indian Institute of Technology Bhubaneswar (1203-05-40788)

9:00AM *On some asymptotic problems involving positive and negative square energies*  
 (238.3) **Dheer Noal Desai**<sup>\*</sup>, University of Memphis and **Maarten De Boeck**, University of Memphis (1203-05-44220)

9:30AM *Some problems on square energy of graphs*  
 (238.4) **Hitesh Kumar**<sup>\*</sup>, Simon Fraser University (1203-05-43274)

- 10:00AM *Break*
- 10:30AM *Uniform mixing on continuous quantum walks*  
▶ ◆  
(238.6) **Hermie Monerde\***, University of Manitoba (1203-05-41677)
- 11:00AM *Coined quantum walks and weighted adjacency matrices*  
▶ ◆  
(238.7) **Hanmeng (Harmony) Zhan\***, Worcester Polytechnic Institute (1203-05-41964)
- 11:30AM *Signed or oriented Cayley graphs with all eigenvalues integer multiples of  $\sqrt{\Delta}$*   
(238.8) **Xiaohong Zhang\***, University of Montreal and **Chris Godsil**, University of Waterloo (1203-05-45007)

***(239) PME Contributed Session on Research by Undergraduates, V***

FRIDAY, JANUARY 10 8:00AM–12:00PM 615, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Thomas Philip Wakefield**, Youngstown State University

**Chad Awtrey**, Samford University

- 8:00AM *CANCELLED Local Limit Theorem for Finitely Generated Abelian Groups*  
▶ (239.1) **Yutong Yan\***, Colby College (1203-60-40886)
- 8:15AM *Semicircle law for high-dimensional geometric random graphs*  
▶ ◆  
(239.2) **Yifan Cao\***, University of Southern California and **Yizhe Zhu**, University of Southern California (1203-60-46199)
- 8:30AM *Analysis of Kernel Density Estimation Accuracy using Quasi-Monte Carlo Methods*  
▶ (239.3) **Aiwen Li\***, University of Pennsylvania and **Fred Hickernell**, Illinois Institute of Technology (1203-62-38352)
- 8:45AM *Conjugate Flow Analysis For Traveling Waves In A Multilayer Fluid System*  
▶ ◆  
(239.4) **Annie Grace Wang\***, University of Pittsburgh and **Ming Chen**, University of Pittsburgh (1203-76-42063)
- 9:00AM *Math Recitation Sessions' Effects on Peer Engagement and Course Success in College Calculus*  
▶ (239.5) **Catie Corchado\***, California State University, Fresno (1203-97-45949)
- 9:15AM *Stable Subsets of Groups*  
▶ (239.6) **Jad Damaj\***, UC Berkeley and **Teresa Sofia Pollard\***, New York University (1203-03-41569)
- 9:30AM *Matching Matroids over Abelian Groups*  
▶ ◆  
(239.7) **Yujia Wu\***, University of California, San Diego, **Mohsen Aliabadi**, University of California, San Diego and **Sophia Stanislavna Yermolenko**, University of California, San Diego (1203-05-37851)

- 9:45AM *Matchings in Panhandle and Schubert Matroids*  
▶ ◆  
(239.8) **Sophia Stanislavna Yermolenko\***, University of California, San Diego, **Mohsen Aliabadi**, University of California, San Diego and **Yujia Wu**, University of California, San Diego (1203-05-39067)
- 10:00AM *On the Properties of the Impartial Two-player Game Toggle*  
▶ (239.9) **Matthew Cohen\***, Carnegie Mellon University, **Joshua Lowrance\***, Biola University, **Emily Riley\***, Millersville University and **Angel Pedro Torres\***, City College (1203-05-44101)
- 10:15AM *On Partitioning the Hypercube Graph into Initial Segments*  
▶ (239.10) **Wenshi Zhao\***, University of Chicago, **Ethan Speiser Soloway**, University of Pennsylvania and **Megan Triplett**, Dickinson College (1203-05-44580)
- 10:30AM *Coloring Carpets: The Beautiful Intersection of Knots and Tilings*  
▶ (239.11) **Colin Adams**, Williams College, **Thomas Dennis Clarke\***, Williams College, **Michael Keyes\***, Williams College and **Felix Nusbaum\***, Williams College (1203-05-45125)
- 10:45AM *Maximizing Full Length Runs of a Hamiltonian Path in a Cubic Lattice Graph*  
▶ ◆  
(239.12) **Erick Giovanni Maldonado\***, Union Adventist University and **Juan Camilo Alvarez-Wilches**, Andrews University (1203-05-46342)
- 11:00AM *Rainbow Combinatorial Lines in Hypercubes - The Rainbow Hales-Jewett Problem*  
▶ (239.13) **Michael Zheng\***, Amherst College (1203-05-44609)
- 11:15AM *The Ungar Game Played on Various Lattices*  
▶ (239.14) **Katelyn Gan\***, Sage Hill School, MIT PRIMES-USA and **Yunseo Choi**, Harvard University (1203-06-44370)
- 11:30AM *Extending the Vieta-Newton Theorem*  
▶ (239.15) **Jeffrey Xu\***, Rutgers University - New Brunswick (1203-08-39684)
- 11:45AM *An analysis of AI generated proof and student proof validation*  
▶ ◆  
(239.16) **Madison Schwartz\***, University of Wisconsin Eau Claire, **Ellah Olson**, University of Wisconsin Eau Claire, **Chloe Lewis**, University of Wisconsin Eau Claire and **Jihye Hwang**, Michigan State University (1203-101-43854)

***(240) PME Contributed Session on Research by Undergraduates, VI***

FRIDAY, JANUARY 10 8:00AM–12:00PM 616, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Thomas Philip Wakefield**, Youngstown State University

**Chad Awtrey**, Samford University

- 8:00AM *Sum of Consecutive Terms of Pell and Related Sequences*  
▶ ◆  
(240.1) **Navvy Anand\***, California Institute of Technology, **Amit Basistha**, Indian Statistical

- Institute, Bangalore, **Alexander Zhu**, Carleton College, **Alexander Gong**, Columbia University, **Steven Joel Miller**, Williams College and **Kenneth B Davenport**, Unaffiliated (1203-11-36992)
- 8:15AM  
▶ ◆  
(240.2) *'Taylor' Miller Rabin*  
**Taylor G Mendes**<sup>\*</sup>, Spelman College (1203-11-40291)
- 8:30AM  
▶ (240.3) *Primes of the form  $2^a 3^b + 1$*   
**Darius Aidan Jones**<sup>\*</sup>, Whitney M. Young Magnet High School, Chicago, IL, USA (1203-11-43370)
- 8:45AM  
▶ (240.4) *Frobenius discriminants of elliptic curves*  
**Bogdan Felix Jones**<sup>\*</sup>, Walter Payton College Preparatory High School, Chicago, Illinois, USA (1203-11-43460)
- 9:00AM  
▶ ◆  
(240.5) *Random Lipschitz Functions on Graphs with Bounded Expansion*  
**Senem Isik**<sup>\*</sup>, Stanford University and **Jinyoung Park**, Courant Institute of Mathematical Sciences, NYU (1203-05-46006)
- 9:15AM  
▶ (240.6) *Analyzing the Construction of Locally Recoverable Codes from Paradoxical Families*  
**Abhi Shukul**, University of Michigan - Ann Arbor, **Noah Smith**<sup>\*</sup>, Occidental College, **Giacomo Micheli**, University of South Florida and **Vincenzo Pallozzi Lavorante**, University of South Florida (1203-11-46421)
- 9:30AM  
▶ ◆  
(240.7) *Characters of Lie Algebra*  
**Evelina Tina Rut Gustafsson**<sup>\*</sup>, University of Alabama in Huntsville (1203-17-42984)
- 9:45AM  
▶ (240.8) *Random Groups Acting on  $CAT(0)$  Cube Complexes*  
**Nhi Luong**<sup>\*</sup>, Carleton College, **Yang Tan**<sup>\*</sup>, Carleton College, **Xingyi Zhang**, Carleton College, **Nathaniel Cheng**, Carleton College, **Lee Li**, Carleton College and **MurphyKate Montee**, Carleton College (1203-20-43797)
- 10:00AM  
▶ (240.9) *A combinatorial approach to the word problem for  $p$ -groups*  
**Isaac Cheng**<sup>\*</sup>, Swarthmore College, **Karn Chutinan**<sup>\*</sup>, Dover-Sherborn High School and **Anastasia Lee**<sup>\*</sup>, Stuyvesant High School (1203-20-44236)
- 10:15AM  
▶ (240.10) *Finite quotients of Fuchsian groups*  
**Frankie Chan**, Davidson College and **Lindsey Styron**<sup>\*</sup>, Davidson College (1203-20-46383)
- 10:30AM  
▶ ◆  
(240.11) *Garside shadows in some rank 3 affine Coxeter groups*  
**Jordan Christopher Bounds**, Furman University, **Devin Bryant**<sup>\*</sup>, Furman University, **Menna Ellaqany**, Furman University, **Sam Housand**, Furman University and **Yeeka Yau**, University of Sydney (1203-20-46399)
- 10:45AM  
▶ ◆  
(240.12) *Elliptic Curves and Bounding the 7-Torsion of Ideal Class Groups of Imaginary Quadratic Fields*

**Ryder Tu Pham**<sup>\*</sup>, University of Pittsburgh and **Carl Wang-Erickson**, University of Pittsburgh (1203-11-40834)

- 11:00AM  
▶ (240.13) *A Sandwich Type Inequality for Positive Fractions*  
**Alexander Gabriel Alvarez**<sup>\*</sup>, University of South Carolina Salkehatchie (1203-26-40135)
- 11:15AM  
▶ (240.14) *Variations on Random Harmonic Series*  
**Zoltan B Lauko**<sup>\*</sup>, Macalester College (1203-40-42625)
- 11:30AM  
▶ ◆  
(240.15) *The Snapshot Problem For Wave Equations on Homogeneous Trees*  
**Dr. Fulton B. Gonzalez**, Tufts University, **Katie Hallett**, Saint Lawrence University, **Quill I. Nebeker-Monch**<sup>\*</sup>, North Carolina State University at Raleigh and **Andrew Sailstad**<sup>\*</sup>, University of Minnesota (1203-43-40711)
- 11:45AM  
▶ ◆  
(240.16) *Analysis of Steplength and Initial Direction Selection for an R-Secant Method for Nonsmooth Optimization*  
**Linsen Liu**<sup>\*</sup>, Contributory, **Paul Trey Wilhoit**<sup>\*</sup>, Contributory and **Jordan Tierney**<sup>\*</sup>, Colorado School of Mines (1203-49-46422)

### ***(241) PME Contributed Session on Research by Undergraduates, VII***

**FRIDAY, JANUARY 10 8:00AM–12:00PM**      **618, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Thomas Philip Wakefield**, Youngstown State University  
**Chad Awtrey**, Samford University

- 8:00AM  
▶ ◆  
(241.1) *Optimal Design Problems with Cost Function: Regularity of Minimizers and Free Boundary Analysis*  
**Saja Gherri**<sup>\*</sup>, University of Michigan, **Andrew Thomas Hale**, University of Minnesota and **Eduardo V. Teixeira**, University of Central Florida (1203-49-46482)
- 8:15AM  
▶ (241.2) *Counting Matrices Over Finite Fields With  $sq$ -Analogues*  
**Jake Cowden**<sup>\*</sup>, Washington & Jefferson College (1203-05-46419)
- 8:30AM  
▶ (241.3) *Convex Lattice Polygons with  $k \geq 3$  Interior Lattice Points*  
**Dana Paquin**, California Polytechnic State University, **Tri Tran**<sup>\*</sup>, California Polytechnic State University and **Elli Sumera**, California Polytechnic State University (1203-06-38961)
- 8:45AM  
▶ (241.4) *Congruence Classes of Simplex Structures in Finite Field Vector Spaces*  
**Kareem Jaber**<sup>\*</sup>, Princeton University, **Vismay Sharan**<sup>\*</sup>, Yale University, **Timothy Cheek**, University of Michigan, **Marie-Helene Tome**, Duke University, **Jenna Martin Shuffelton**, Williams College, **Joseph Cooper**, University of Cambridge, **Pico Gilman**, University of California Santa Barbara, **Eyvindur Ari Palsson**, Virginia Tech and **Alex Iosevich**, University of Rochester (1203-52-45203)

9:00AM  $H$  | "older estimates for a family of quasi-metrics on the space of convex bodies  
 ▶ (241.5) **Ayooluwanitemi Aitokhuehi**, Rice University, **Benjamin Braiman**, University of Wisconsin - Madison, **David Owen Horace Cutler**, Tufts University, **Tamas Darvas**, University of Maryland, **Robert Deaton**, Georgia Institute of Technology, **Prakhar Gupta**, University of Maryland, **Jude Horsley**, University of Utah, **Vasanth Pidaparthi**, University of Maryland and **Jen Tang**, University of Chicago (1203-52-46360)

9:15AM *The Truncated Octahedral Conjecture*  
 ▶ (241.6) **Lark Song**, University of Pittsburgh (1203-52-46490)

9:30AM *Representation Stability of (Co)homology Groups of Vertical Configuration Spaces*  
 ▶ ◆ (241.7) **David Baron**, Williams College, **Chunye Yang**, University of Michigan and **Chenglu Wang**, University of Pennsylvania (1203-55-39241)

9:45AM *Determinant Sequences of Five-Strand Spiral Knots*  
 ▶ (241.8) **Ms. Molly A Chapman**, Duquesne University (1203-57-41601)

10:00AM *Beads, Bracelets and Bongles: Hyperbolic knots in handlebodies*  
 ▶ (241.9) **Jiachen Kang**, University of Michigan, **Lukas Krause**, University of California-Berkeley, **Gregory Li**, Harvard University, **Reyna Li**, Williams College, **Chloe Marple**, Pomona College, **Francisco Gomez-Paz**, MIT and **Ziwei Tan**, Bryn Mawr College (1203-57-46361)

10:15AM *An Exhaustive Search of Legendrian Knot Mosaics*  
 ▶ (241.10) **Margaret Kipe**, University of Pittsburgh, Department of Mathematics, **Samantha Pezzimenti**, Penn State Brandywine, **Leif Erik Schaumann**, Kenyon College, Department of Mathematics, **Luc Đinh-Khuong Ta**, Yale University, Department of Mathematics and **Tony Wing Hong Wong**, Kutztown University of Pennsylvania (1203-57-46502)

10:30AM *Stably Unactivated Neurons in ReLU Neural Networks*  
 ▶ ◆ (241.11) **Natalie Brownlowe**, Towson University, **Ethan Montes**, Wofford College, **Gabriel B. Quijano**, Auburn University and **Grace Stulman**, Towson University (1203-60-46510)

10:45AM *Gaussian Graphical Models Arising from Symmetries in Brownian Motion Tree Models: A Toric Approach*  
 ▶ (241.12) **Emma Cardwell**, Harvard University, **Aida Maraj**, Max Planck Institute CBG and **Alvaro Ribot**, Harvard University (1203-62-42961)

11:00AM *Determining Tumor Status Using RStudio: Characteristics Influencing Benignity and Malignancy*  
 ▶ ◆ (241.13) **Hailey Brown**, Spelman College (1203-62-45275)

11:15AM *Freeburg Lucas Primality Test*  
 ▶ (241.14)

**Brianna E Freeburg**, Spelman College (1203-11-41748)

11:30AM *Building AI Models to Improve Medical Diagnosis*  
 ▶ ◆ (241.15) **Emilio Sebastian Daza Vigo**, Dartmouth College (1203-68-44817)

11:45AM *Simulating Quantum Circuits with Non-Clifford Noise using Stabilizer Formalism*  
 ▶ (241.16) **Peter Ye**, Yale University, **Jad Soucar**, University of California - Los Angeles, **Brandin Farris**, Washington State University and **Daley McMahon**, University of Pennsylvania (1203-81-42300)

### (242) PME Contributed Session on Research by Undergraduates, VIII

FRIDAY, JANUARY 10 8:00AM-12:00PM 619, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Thomas Philip Wakefield**, Youngstown State University  
**Chad Awtrey**, Samford University

8:00AM *Orthogonal Polynomials and Perfect State Transfer on Cycle Graphs*  
 ▶ (242.1) **Sam Sunday Trombone**, Hamilton College, **Leia Donaway**, Swarthmore College, **Elizabeth Athaide**, Massachusetts Institute of Technology, **Maxim S. Derevyagin**, University of Connecticut and **Rachel Bailey**, University of Connecticut (1203-81-44944)

8:15AM *Parallel Tempering as an Optimization Algorithm*  
 ▶ ◆ (242.2) **Mark Cerberus Dubynskiy**, George Mason University, Mason Experimental Geometry Lab (1203-81-45959)

8:30AM *Optimizing Materials Discovery for Photovoltaics in Space using Quantum Machine Learning*  
 ▶ (242.3) **Soheil Rasouli**, University of Tehran, **Mohammed Alahmady Abdullah**, Tanta University, **Puja Chakraborty**, Mount Holyoke College and **Maria Nicos Alain Pasaylo**, University of Florida (1203-81-46386)

8:45AM *Genomic Distances Between Individuals in a Graphical Context*  
 ▶ ◆ (242.4) **Maxwell David Kooiker**, California State University, San Marcos (1203-92-37682)

9:00AM *Analysis of a Delay Differential Equations Mathematical Model of Chronic Myelogenous Leukemia*  
 ▶ ◆ (242.5) **Dana Paquin**, California Polytechnic State University, **Giovani Thai**, Cal Poly SLO, **Avery Stewart**, California Polytechnic State University and **Lizzy Gross**, California Polytechnic State University (1203-92-38960)

9:15AM *Diophantine  $m$ -tuples of Triangular Numbers*  
 ▶ (242.6) **Sounak Bagchi**, Euler Circle and **Christian Zhou-Zheng**, Euler Circle (1203-11-42113)

- 9:30AM  
▶ (242.7) *Toric Surface Codes and the Periodicity of Polytopes*  
**Amelia Gibbs**<sup>\*</sup>, Trinity University, **Nicholas Toloczko**<sup>\*</sup>, University of North Carolina - Wilmington, **Eliza Hogan**, University of Michigan - Flint, **Kelly Jabbusch**, University of Michigan Dearborn and **Jenna Plute**, Texas A&M University (1203-94-39804)
- 9:45AM  
▶ (242.8) *Uniform distribution and computability theory: UD randomness*  
**Sierra Dawn Edelstein**<sup>\*</sup>, University of Florida and **Noah G Giddings**<sup>\*</sup>, Butler University (1203-03-46205)
- 10:00AM  
▶ (242.9) *On the Density of Low Lying Zeros of a Large Family of Automorphic  $SL_2$ -functions*  
**Timothy Cheek**<sup>\*</sup>, University of Michigan, **Pico Gilman**, University of California Santa Barbara, **Kareem Jaber**, Princeton University, **Steven Joel Miller**, Williams College and **Marie-Helene Tome**<sup>\*</sup>, Duke University (1203-11-40882)
- 10:15AM  
▶ (242.10) *Mixed Tensor Products, Capelli Berezinians, and Newton's Formula for  $\mathcal{S}(\mathfrak{gl}(m|n))$*   
**Sidarth Erat**<sup>\*</sup>, MIT PRIMES-USA, **Arun S Kannan**, MIT PRIMES-USA Mentor and **Shihan Kanungo**<sup>\*</sup>, MIT PRIMES-USA (1203-17-41233)
- 10:30AM  
▶ (242.11) *Categorical Tiling Theory*  
**Catherine DiLeo**<sup>\*</sup>, Tufts University and **Preston Sessoms**<sup>\*</sup>, Clemson University (1203-18-39921)
- 10:45AM  
▶ (242.12) *Box Counting Fractal Dimension in Boundaries of Newton's Method*  
**Avery Ryan Cagle**<sup>\*</sup>, Hendrix College and **Lathan C Smalley**<sup>\*</sup>, Hendrix College (1203-28-46411)
- 11:00AM  
▶ ◆ (242.13) *The Variational Principle for Locally Finite Countable State Shift Spaces with Specification*  
**Amy Somers**<sup>\*</sup>, University of California, Santa Barbara and **Alex M Paschal**<sup>\*</sup>, University of North Carolina at Chapel Hill (1203-37-40633)
- 11:15AM  
▶ ◆ (242.14) *Exploring Patterns in Mathematics Faculty Hiring with Persistent Homology*  
**Makenna M. Greenwalt**<sup>\*</sup>, University of Oregon, **Kelvin Luu**<sup>\*</sup>, University of California, Los Angeles and **Ahoora Tamizifar**<sup>\*</sup>, University of California, Irvine (1203-91-46212)
- 11:30AM  
▶ (242.15) *Determining the Effect of Curvature in Mathematical Models of Cell Migration*  
**Jianda Du**<sup>\*</sup>, University of Florida, **Grace Bachmann**, University of Florida, **Holley Lynch**, Stetson University, **Lance Davidson**, University of Pittsburgh and **Tracy L Stepien**, University of Florida (1203-92-45954)

**(243) SIAM Minisymposium on Mathematical Perspectives on Generative Modeling, I**

FRIDAY, JANUARY 10 8:00AM–11:00AM 2B, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Benjamin Zhang**, Brown University

**Jimmie Adriaola**, Arizona State University

- 8:00AM  
▶ (243.1) *Proximal optimal transport divergences for generative modeling*  
**Luc Rey-Bellet**<sup>\*</sup>, University of Massachusetts Amherst (1203-60-37986)
- 8:30AM  
▶ (243.2) *Combining Wasserstein-1 and Wasserstein-2 proximals: robust manifold learning via well-posed generative flows*  
**Hyemin Gu**<sup>\*</sup>, University of Massachusetts Amherst (1203-68-43472)
- 9:00AM  
▶ ◆ (243.3) *Bridging mean-field games and normalizing flows with trajectory regularization*  
**Jiajia Yu**<sup>\*</sup>, Duke University (1203-49-38436)
- 9:30AM  
◆ (243.4) *HJ-sampler: a Bayesian sampler for inverse problems of a stochastic process by leveraging Hamilton-Jacobi PDEs and score-based generative models*  
**Tingwei Meng**<sup>\*</sup>, UCLA, **Zongren Zou**, Brown University, **Jerome Darbon**, Brown University and **George Em Karniadakis**, Brown University (1203-62-40256)
- 10:00AM  
(243.5) *Score-based generative models are provably robust: an uncertainty quantification perspective*  
**Nikiforos Mimikos-Stamatopoulos**<sup>\*</sup>, Universite Cote d'Azur, **Benjamin Zhang**, Brown University and **Markos Katsoulakis**, University of Massachusetts Amherst (1203-35-46198)
- 10:30AM  
(243.6) *Performance Guarantees for  $(f, \Gamma)$ -GANs*  
**Jeremiah Birrell**<sup>\*</sup>, Texas State University (1203-62-42844)
- (244) SIAM Minisymposium on Reduced Order Models for Convection-Dominated Flows: Modeling, Analysis, and Simulation, I**
- FRIDAY, JANUARY 10 8:00AM–11:00AM 3A, Level Three, Seattle Convention Center Arch at 705 Pike
- Organizers: **Jorge Reyes**, Virginia Tech  
**Ping-Hsuan Tsai**, Virginia Tech  
**Traian Iliescu**, Virginia Tech
- 8:00AM *Break*
- 8:30AM  
(244.2) *Accelerating Numerical Simulations by Model Reduction with Scientific and Physics-Informed Machine Learning*  
**Gianluigi Rozza**<sup>\*</sup>, SISSA (1203-65-40522)
- 9:00AM  
▶ (244.3) *Tensor parametric Hamiltonian operator inference*  
**Arjun Vijaywargia**, Sandia National Laboratories, University of Notre Dame, **Shane A McQuarrie**, Sandia National Laboratories and **Anthony Gruber**<sup>\*</sup>, Sandia National Laboratories (1203-65-42014)
- 9:30AM  
(244.4) *Approximating a branch of solutions to the Navier-Stokes equations by reduced-order modeling*

**Maxim A Olshanskii**, University of Houston and **Leo G Rebholz**, Clemson University (1203-65-38756)

10:00AM  
▶ (244.5) *Reduced order models for Lagrangian hydrodynamics*  
**Siu Wun Cheung**, Lawrence Livermore National Laboratory, **Youngsoo Choi**, Lawrence Livermore National Laboratory, **Dylan Copeland**, Lawrence Livermore National Laboratory and **Kevin Huynh**, University of Pittsburgh (1203-76-42000)

10:30AM  
▶ ◆ (244.6) *Towards adaptive hybrid models via domain decomposition*  
**Irina Tezaur**, Sandia National Laboratories, **Chris Wentland**, Sandia National Laboratories, **Ian Moore**, Virginia Tech, **Joshua Barnett**, Cadence Design Systems and **Francesco Rizzi**, NexGen Analytics (1203-35-38977)

**(245) SIGMA Special Session on Research in Undergraduate Mathematics Education, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 610, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Brian P Katz**, California State University, Long Beach

**Deborah Moore-Russo**, University of Oklahoma

**Shandy Hauk**, San Francisco State University  
**Kaitlyn Stephens Serbin**, The University of Texas Rio Grande Valley

8:00AM  
▶ (245.1) *Understanding College Students' Conceptions of Equivalent Expressions and Equations*  
**Claire W. Wladis**, BMCC/CUNY and the CUNY Graduate Center, **Alison Mirin**, University of Arizona, **Benjamin Sencindiver**, University of Texas at San Antonio and **Kathleen Offenholley**, BMCC/CUNY (1203-97-41585)

8:30AM  
▶ (245.2) *Examining Nuances of Subtraction and Division in Counting Problems*  
**Elise Lockwood**, Oregon State University, **Zackery K Reed**, Embry Riddle Aeronautical University Worldwide and **John Caughman**, Portland State University (1203-97-42008)

9:00AM  
▶ (245.3) *Exploring Lists and Listing Processes in Combinatorics*  
**Adaline Elisabeth De Chenne**, New Mexico State University (1203-97-44784)

9:30AM  
▶ (245.4) *Exploring Subjectivity and Cognitive Processes in Students' Combinatorial Thinking*  
**Niusha Modabbernia**, Simon Fraser University (1203-97-45758)

10:00AM  
▶ (245.5) *On the Right-to-Left Addition Convention and Its Hindrance to Undergraduate Students' Understanding of Repeating Decimals*  
**Gleb Glebov**, Simon Fraser University and **Niusha Modabbernia**, Simon Fraser University (1203-97-45778)

10:30AM  
▶ (245.6) *Understanding Student Misconceptions in Geometry The Impact of External Points on Problem Solving*  
**Amirhossein Zabeti**, Salam Highschool (1203-97-45795)

11:00AM  
▶ (245.7) *Metacognitive Processes of Undergraduate Students During Mathematical Proof Construction*  
**Sarah L. Sparks**, University of Northern Colorado (1203-101-45023)

11:30AM  
▶ (245.8) *Reading Proofs: Purposes and Strategies of Undergraduate Mathematics Students*  
**MaryPatricia Sill**, Indiana State University, **Yi-Yin Ko**, Indiana State University and **Eliza Baker**, Indiana State University (1203-97-40339)

**(246) SLMath (MSRI) Special Session on ADJOINT Mathematics Working Groups, I**

FRIDAY, JANUARY 10 8:00AM–12:00PM 611, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Edray Herber Goins**, Pomona College

**Anisah Nabilah Nu'Man**, Spelman College  
**Hélène Barcelo**, MSRI

8:00AM  
▶ (246.1) *Mathematics of human behavior and epidemics*  
**Abba Gumel**, University of Maryland (1203-92-41786)

8:30AM  
▶ (246.2) *Interaction between defense mechanisms and Allee effects on prey populations with disease*  
**Kwadwo Antwi-Fordjour**, Samford University (1203-92-40734)

9:00AM  
▶ (246.3) *Sturm Bound for Modular forms on  $SO(4,3)$*   
**Karen E Taylor**, Bronx Community College, CUNY (1203-11-44587)

9:30AM  
▶ ◆ (246.4) *Mathematical Modeling Insights into Improving CAR T cell Therapy for Solid Tumors with Bystander Effects*  
**Chartese Darnel Jones**, University of Missouri, Columbia and **Trachette Jackson**, University of Michigan (1203-93-41684)

10:00AM  
▶ ◆ (246.5) *Understanding Transport and Airborne Transmission of Respiratory Infectious Diseases for an Optimal Classroom Design*  
**Abba Gumel**, University of Maryland, **Shamia Hoque**, University of South Carolina, **Sherry Euvette Scott**, MSRI ADJOINT and **Matthew B Williams**, US Coast Guard Academy (1203-104-42700)

10:30AM  
▶ ◆ (246.6) *Outlier Detection with Graph Convolution and a Variational Autoencoder*  
**Kossi Edoh**, NC A&T State University and **Henry Powers**, Brown University (1203-05-40838)

11:00AM  
▶ (246.7) *Weak Solutions of Nonlinear Elliptic Problems with Growth up to Critical Exponents*  
**Nsoki Mavinga**, Swarthmore College, **Timothy Ira Myers**, Howard University and

**Marius M. Nkashama**, University of Alabama at Birmingham (1203-35-42549)

11:30AM  
(246.8) *Mathematics as a Design Tool for Science and Engineerin*  
**Tepper L. Gill**<sup>\*</sup>, Howard University (1203-00-42756)

**(247) AMS Special Session on Extremal Combinatorics and Random Discrete Structures, I**

FRIDAY, JANUARY 10 8:30AM–12:00PM **Tahoma 3, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Corrine Yap**, Rutgers University  
**Sam Spiro**, Rutgers University

8:30AM  
▶ (247.1) *On Off-Diagonal F-Ramsey numbers*  
**Sammy Y Luo**<sup>\*</sup>, Massachusetts Institute of Technology and **Zixuan Xu**, Massachusetts Institute of Technology (1203-05-41561)

9:00AM  
▶ (247.2) *On the maximum  $\mathbb{F}_q$ -free induced subgraphs  $\mathbb{H}$  in  $\mathbb{K}_t$ -free graphs*  
**József Balogh**, University of Illinois Urbana-Champaign, **Ce Chen**, University of Illinois Urbana-Champaign and **Haoran Luo**<sup>\*</sup>, University of Illinois Urbana-Champaign (1203-05-41667)

9:30AM  
(247.3) *Comparative Results and Applications of Flag Algebra*  
**Nicholas Crawford**<sup>\*</sup>, University of Colorado Denver (1203-05-40374)

10:00AM  
(247.4) *The Turán Density of Tight 4-Uniform Cycles*  
**Maya Sankar**<sup>\*</sup>, Stanford University (1203-05-41450)

10:30AM  
(247.5) *On the number of  $\mathbb{F}_q$ -free set families for tree posets  $\mathbb{P}$ .*  
**Ramon Ivan Garcia Alvarez**<sup>\*</sup>, University of Illinois Urbana-Champaign (1203-06-41041)

11:00AM  
(247.6) *Extremal problems for given order and generalizations of independence numbers*  
**Dheer Noal Desai**<sup>\*</sup>, University of Memphis and **Vishal Gupta**, University of Delaware (1203-05-43966)

11:30AM  
(247.7) *Gale duality in Hilbert spaces*  
**Catherine Babecki**<sup>\*</sup>, California Institute of Technology (1203-52-41163)

**(248) AMS Special Session on Fractal Geometry with Applications to Analysis, Number Theory and Mathematical Physics, I**

FRIDAY, JANUARY 10 8:30AM–12:00PM **310, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Franklin A. Mendivil**, Acadia University  
**Claire David**, Sorbonne University  
**Michel L. Lapidus**, AMS  
**Hafedh Herichi**, Organizer

8:30AM  
(248.1) *On Complex Dimensions of Self-Similar Attractors*

**Will Hoffer**<sup>\*</sup>, University of California, Riverside (1203-28-40985)

9:00AM  
▶ (248.2) *Hamiltonian Paths on Random Planar Maps*  
**Bertrand Duplantier**<sup>\*</sup>, Paris-Saclay University (1203-82-40270)

10:00AM  
▶ (248.3) *Self-Similar Fractal Strings and Quasicrystals*  
**Machiel van Frankenhuijsen**<sup>\*</sup>, Utah Valley University (1203-42-40964)

10:30AM  
▶ ♦ (248.4) *Surjectivity of spectral multipliers on p.c.f. fractals*  
**Kasso A. Okoudjou**<sup>\*</sup>, Tufts University, **Fulton B. Gonzalez**, Tufts University and **Effie Papageorgiou**, Universität Paderborn (1203-28-43708)

11:00AM  
(248.5) *Limit space of self-similar groups and their conformal dimension*  
**Volodymyr Nekrashevych**<sup>\*</sup>, Texas A&M University (1203-20-44203)

**AWM Workshop: EvenQuads Translate-a-Thon**

FRIDAY, JANUARY 10 8:30AM–10:00AM **4C-2, Level Four, Seattle Convention Center Arch at 705 Pike**

The EvenQuads project honors women in mathematics on a deck of cards, with one biography per card. All biographies are currently in English. JMM participants who know Spanish are invited to help translate these biographies. (Fluency in Spanish is not needed—proficiency is fine!) This event is inspired by the Wiki-thons that have been held at previous JMMs.

Organizers: **Xavier Ramos Olive**, Smith College  
**Monica D. Morales-Hernandez**, Adelphi University  
**Oscar Vega**, California State University Fresno  
**Oscar Vega**, California State University Fresno

**CANCELLED AMS BEGIN Sponsors Panel**

FRIDAY, JANUARY 10 8:30AM–10:00AM **4C-3, Level Four, Seattle Convention Center Arch at 705 Pike**

Prepare for an exhilarating panel discussion with our esteemed event sponsors at the 2025 Joint Mathematics Meetings! Explore the boundless opportunities for mathematicians in BEGIN (Business, Entrepreneurship, Government, Industry, Nonprofit) with the backing of our premier sponsors. Uncover endless possibilities and forge valuable connections. Mark your calendar and ignite your career in BEGIN with the support of our prestigious sponsors!

Organizer: **Sarah Bryant**, American Mathematical Society

**JMM Panel on Data Science in Undergraduate Mathematics Classrooms: Why and How?**

FRIDAY, JANUARY 10 8:30AM–10:00AM **4C-4, Level Four, Seattle Convention Center Arch at 705 Pike**

Many mathematics departments are wrestling with how and if to incorporate data science. A new major? New courses? New versions of existing courses? Refocused labs and

activities? This panel will illustrate the range of ongoing efforts to address this challenge. Each speaker will explain the approach they chose and their rationale for choosing it. They will show sample materials, describe student outcomes, and talk about ways to fit data science into an already-full curriculum.

Organizers: **Deborah Hughes Hallett**, University of Arizona/Harvard Kennedy School  
**Deborah Hughes Hallett**, University of Arizona/Harvard Kennedy School  
**Aaron D. Wootton**, University of Portland  
**Adam Spiegler**, University of Colorado Denver  
**Adam Forland**, Red Rocks Community College  
**Alan Garfinkel**, UCLA  
**Eric J Kostelich**, Arizona State University, School of Mathematical and Statistical Sciences  
**Bethany Johnson**, CalPoly Humboldt

***(249) NSF Special Session on Outcomes and Innovations from NSF Undergraduate Education Programs in the Mathematical Sciences, I***

FRIDAY, JANUARY 10 8:30AM–12:00PM 603, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Michael Ferrara**, Division of Undergraduate Education, National Science Foundation

8:30AM (249.1) *STEM Instructors Learning and Teaching Bayesian Methods*  
**Mine Dogucu**<sup>\*</sup>, University of California, Irvine, **Amy Herring**, Duke University and **Jingchen Hu**, Vassar College (1203-101-39506)

9:00AM (249.2) *Approaches to Broadening Participation in Undergraduate Statistics and Data Science Education*  
**Sunghwan Byun**<sup>\*</sup>, North Carolina State University (1203-101-43803)

9:30AM (249.3) *MASDER Statistics and Data Science Attitudes: A Platform for Collecting Quality Data and Visualizing Results*  
**Alana Jane Unfried**<sup>\*</sup>, California State University, Monterey Bay, **Marjorie Bond**, Pennsylvania State University, **April Kerby-Helm**, Winona State University, **Michael A Posner**, Villanova University and **Douglas Whitaker**, Mount Saint Vincent University (1203-97-42386)

10:00AM (249.4) *PALiSaDS: The Pacific Alliance for Low-income Inclusion in Statistics and Data Science*  
**Abel Rodriguez**<sup>\*</sup>, University of Washington (1203-62-44418)

10:30AM (249.5) *Taking CalcPlot3D to the Next Dimension: Creating 3D Printed Learning Materials*  
**Paul E. Seeburger**<sup>\*</sup>, Monroe Community College, **Shelby Stanhope**, U.S. Air Force Academy and **Deborah Moore-Russo**, University of Oklahoma (1203-97-43737)

11:00AM (249.6) *Virtual Reality Linear Algebra: Putting Embodied, Enactive, Extended, and Embedded Knowing to Work*

**Ferdinand Rivera**<sup>\*</sup>, San Jose State University (1203-97-39744)

11:30AM *Discussion*

***(250) Spectra Special Session on Research by LGBTQ+ Mathematicians, I: Theory, Combinatorics***

FRIDAY, JANUARY 10 8:30AM–12:00PM 400, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Michael A. Hill**, UCLA  
**Devavrat Dabke**, Level Ventures

8:30AM (250.1) *On spectra of BCK-algebras*  
**Matt Evans**<sup>\*</sup>, Washington & Jefferson College (1203-06-39219)

8:45AM (250.2) *A Hierarchy of Symmetric Quantum Cellular Automata*  
**Corey Jones**, North Carolina State University, **Kylan Schatz**<sup>\*</sup>, North Carolina State University and **Dominic J Williamson**, IBM (1203-18-44783)

9:00AM (250.3) *Parabolic subgroups of Artin groups via categorification. Preliminary*  
**Sinead Wilson**<sup>\*</sup>, Australian National University (1203-20-45770)

9:15AM (250.4) *Lines on cubic fourfolds containing multiple cubic scrolls*  
**Corey Brooke**<sup>\*</sup>, Carleton College, **Sarah Frei**, Dartmouth College, **Lisa Marquand**, Courant Institute at New York University and **Xuqiang Qin**, University of North Carolina at Chapel Hill (1203-14-45144)

9:30AM (250.5) *Orbit-Preserving Decompositions of Representations*  
**Maya Ornstein**<sup>\*</sup>, University of Colorado, Boulder (1203-14-45607)

9:45AM (250.6) *A Hilbert Basis Analog for Non-polyhedral Cones: The Case of the PSD and SOC Cones*  
**Brittney Marsters**<sup>\*</sup>, University of California, Davis, **Jesús A. De Loera**, Dept. of Mathematics, Univ. California, **Luze Xu**, UC Davis and **Shixuan Zhang**, Texas A&M University (1203-52-45809)

10:00AM (250.7) *Using Quandle Invariants to Distinguish Classical and Legendrian Knots*  
**Peyton Phinehas Wood**<sup>\*</sup>, UC Davis (1203-57-45810)

10:15AM (250.8) *Computing the Mosaic Numbers of Legendrian Knots*  
**Margaret Kipe**, University of Pittsburgh, **Samantha Pezzimenti**, Penn State Brandywine, **Leif Erik Schaumann**, Kenyon College, **Luc Dinh-Khuong Ta**<sup>\*</sup>, Yale University and **Tony Wing Hong Wong**, Kutztown University of Pennsylvania (1203-57-39107)

10:30AM (250.9) *Stable Tamari Posets on Length-Three Sequences with One Peak*  
**Tahda Queer**<sup>\*</sup>, Hunter College, City University of New York, **Djeneba Diop**, Hobart and William Smith Colleges and **Anna Pun**, CUNY

Graduate Center, CUNY Baruch College (1203-06-44681)

- 10:45AM  
▶ ◆  
(250.10) *Amplituhedra, Cluster Algebras, and Scattering Amplitudes*  
**Matteo Parisi**<sup>\*</sup>, CMSA, Harvard University (1203-05-44800)
- 11:00AM  
(250.11) *Higher Specht bases and  $q$ -series for certain Hessenberg varieties*  
**Kyle Salois**<sup>\*</sup>, Colorado State University (1203-05-44637)
- 11:15AM  
▶ ◆  
(250.12) *Matroids and their cycle systems: the  $sh$ -vector conjecture for a new class of matroids*  
**Solis Tomas Juggernaut McClain**<sup>\*</sup>, Reed College and **David Perkinson**, Reed College (professor) (1203-05-45446)
- 11:30AM  
▶ (250.13) *Metered Parking Functions*  
**Spencer Daugherty**<sup>\*</sup>, University of Colorado Boulder, **Pamela Estephania Harris**, Williams College, **Ian Klein**, North Carolina State University and **Matt McClinton**, University of Wisconsin-Milwaukee (1203-05-45385)

**(251) TPSE Invited Address - Joan Ferrini-Mundy, University of Maine**

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FRIDAY, JANUARY 10 8:30AM-9:35AM Ballroom 6C,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizers: **Scott Andrew Wolpert**, University of Maryland and TPSE Math  
**Scott Andrew Wolpert**, University of Maryland and TPSE Math

- 8:30AM  
▶ (251.1) *Learning, Teaching, and Doing Mathematics in the Era of AI: New Challenges and Opportunities*  
**Joan Ferrini-Mundy**<sup>\*</sup>, University of Maine (1203-104-45418)

**(252) AMS Special Session on Coloring Problems in Combinatorics, I**

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FRIDAY, JANUARY 10 9:00AM-12:00PM Tahoma 4, Level  
Three, Seattle Convention Center  
Arch at 800 Pike

Organizers: **Daniel P Johnston**, Trinity College  
**Jeremy Quail**, University of Vermont  
**Puck Rombach**, University of Vermont  
**Neal Bushaw**, Virginia Commonwealth University

9:00AM  
(252.1) *On saturation and rainbow saturation numbers of certain trees*  
**Calum Buchanan**<sup>\*</sup>, University of Vermont, **Neal Bushaw**, Virginia Commonwealth University, **Daniel P Johnston**, Trinity College and **Puck Rombach**, University of Vermont (1203-05-45184)

- 9:30AM  
(252.2) *Generalized Rainbow Turán Numbers of Forests*  
**Daniel P Johnston**<sup>\*</sup>, Trinity College, **Cory Palmer**, University of Montana and **Puck**

**Rombach**, University of Vermont (1203-05-45462)

- 10:00AM  
(252.3) *Minimum color degree thresholds for rainbow subgraphs*  
**Andrzej Czygrinow**, Arizona State University, **Theodore N Molla**<sup>\*</sup>, University of South Florida and **Brendan Nagle**, University of South Florida (1203-05-44721)
- 10:30AM  
▶ (252.4) *Directed graphs without rainbow stars*  
**Dániel Gerbner**, Alfréd Rényi Institute of Mathematics, HUN-REN, **Andrzej Grzesik**, Jagiellonian University, **Cory Palmer**<sup>\*</sup>, University of Montana and **Magdalena Prorok**, AGH University of Krakow (1203-05-44064)
- 11:00AM  
(252.5) *Dynamical Threshold for the Fixed-Magnetization Ising Model*  
**Aiya Kuchukova**, Georgia Institute of Technology, **Marcus Pappik**, Hasso-Plattner Institute, **Will Perkins**, Georgia Institute of Technology and **Corrine Yap**<sup>\*</sup>, Georgia Institute of Technology (1203-60-41050)
- 11:30AM  
▶ (252.6) *Rotating webs and promoting tableaux*  
**Leila Katharine Cowan**, Smith College, **Emily Hafken**, University of Virginia, **Kerry Elizabeth Seekamp**, Smith College and **Sharon Spaulding**<sup>\*</sup>, Smith College (1203-05-45241)

**(253) AMS Special Session on Inverse Problems and Harmonic Analysis, I**

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FRIDAY, JANUARY 10 9:00AM-12:00PM 304, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Kasso A. Okoudjou**, Tufts University  
**Eric Todd Quinto**, Department of Mathematics/Tufts University

- 9:00AM  
(253.1) *Dynamical sampling: source term recovery and frames*  
**Akram Aldroubi**<sup>\*</sup>, Vanderbilt University (1203-42-42202)
- 10:00AM  
▶ (253.2) *Deep learning in Inverse Problems via operator networks*  
**Anuj Abhishek**<sup>\*</sup>, Case Western Reserve University (1203-47-42271)
- 10:30AM  
(253.3) *A simple range characterization for spherical mean transform in odd dimensions and its applications*  
**Divyansh Agrawal**, Centre for Applicable Mathematics, Tata Institute of Fundamental Research, Bangalore, India, **Gaik Ambartsoumian**<sup>\*</sup>, University of Texas at Arlington, USA, **Venkateswaran P. Krishnan**, Centre for Applicable Mathematics, Tata Institute of Fundamental Research, Bangalore, India and **Nisha Singhal**, Centre for Applicable Mathematics, Tata Institute of Fundamental Research, Bangalore, India (1203-44-40422)
- 11:00AM  
(253.4) *The Snapshot Problem for the Wave Equation*  
**Jens Gerlach Christensen**<sup>\*</sup>, Colgate University, **Fulton B. Gonzalez**, Tufts University, **Tomoyuki Takeki**, University of Tsukuba and

**Jue Wang**, North China Institute of Science & Technology (1203-35-43153)

11:30AM (253.5) *From inversion of star transform to real algebraic geometry*  
**Mohammad Javad Latifi\***, Dartmouth College and **Gaik Ambartsoumian**, University of Texas at Arlington, USA (1203-44-43568)

**(254) AMS Special Session on Research Presentations by Math Alliance Scholar Doctorates, I**

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FRIDAY, JANUARY 10 9:00AM–12:00PM Skagit 1, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **David Goldberg, PhD**, Purdue University  
**Theresa Martines**, University of Texas, Austin

9:00AM ♦ (254.1) *Koszul Duality in an Equivariant Setting*  
**Sofia Rose Martinez Alberga\***, Purdue University (1203-18-40523)

9:30AM ♦ (254.2) *Conceptual model for Permafrost thawing*  
**Maria Isabel Sanchez Muniz\***, University of Minnesota, Twin Cities (1203-37-44553)

10:00AM ▶ ♦ (254.3) *Deep learning applications in pulmonary biomedical imaging*  
**Jorge Cisneros\***, University of Texas at Austin, **Nathan H. Feldt**, University of Texas at Austin, **Caleb J Herrera**, University of Texas at Austin, **Yi-Kuan Liu**, University of Texas at Austin and **Edward Castillo**, University of Texas at Austin (1203-92-44701)

10:30AM ♦ (254.4) *Identifiability and Parameter Estimation of Within-Host Model of HIV with Immune Response*  
**Yuganthi Liyanage**, Florida Atlantic University, **Leila Mirsaleh Kohan\***, Florida Atlantic University, **Maia Nenkova Martcheva**, University of Florida and **Necibe Tuncer**, Florida Atlantic University (1203-92-43760)

11:00AM ▶ (254.5) *Using Deep Learning to Quantify White-Opaque Switching Events in *Candida albicans* Colonies*  
**Jordan Collignon\***, University of California, Merced, **Ruihao Li**, Cornell University, **Austin Perry**, University of California, Merced, **Suzanne Sindi**, University of California, Merced, **Aaron Hernday**, University of California, Merced and **Clarissa Nobile**, University of California, Merced (1203-92-45153)

11:30AM ▶ ♦ (254.6) *Reconstruction of Extended Regions in EIT with a Generalized Robin Transmission Condition*  
**Giovanni Granados\***, University of North Carolina at Chapel Hill (1203-35-43358)

**(255) AMS Special Session on Results on Curves and Surfaces Inspired by Experiments, I**

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FRIDAY, JANUARY 10 9:00AM–12:00PM 620, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Thi Hanh VO**, University of Luxembourg

**Khanh Le**, Temple University

**Chris Soteros**, University of Saskatchewan

**Puttipong Pongtanapaisan**, University of Saskatchewan

9:00AM (255.1) *The topological and geometrical complexity of random open curves in 3-space*

**Eleni Panagiotou\***, Arizona State University (1203-57-44741)

9:30AM (255.2) *The rank of fibered hyperbolic 3-manifolds with cusps*

**David Futer**, Temple University and **Rob Oakley\***, Temple University (1203-57-43376)

10:00AM (255.3) *Arithmeticity and commensurability of links in thickened surfaces*

**Rose Kaplan-Kelly\***, George Mason University and **David Futer**, Temple University (1203-57-41151)

10:30AM ♦ (255.4) *Distinguishing filling curves via designer metrics*

**Sayantika Mondal\***, The Graduate Center, CUNY (1203-57-42200)

11:00AM ▶ (255.5) *Pin the loop taut: a one-player topological game*

**Christopher-Lloyd Simon**, Penn State University and **Ben Stucky\***, Beloit College (1203-57-38087)

11:30AM (255.6) *Average signature and 4-genus of 2-bridge knots*

**Moshe Cohen\***, State University of New York At New Paltz, **Adam M. Lowrance**, Vassar College, **Neal Madras**, York University and **Steven Raanes**, Ohio State University (1203-57-41010)

**(256) AMS Special Session on SoTL: Connecting Generative AI and Scholarly Inquiry to Improve Teaching and Learning, I**

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FRIDAY, JANUARY 10 9:00AM–12:00PM Chelan 4, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Lewis D. Ludwig**, Denison University  
**Curtis D. Bennett**, California State University, Long Beach  
**Jacqueline M Dewar**, Loyola Marymount University

9:00AM ▶ (256.1) *SoTL in the Age of AI*  
**Lewis D. Ludwig\***, Denison University (1203-101-45300)

10:00AM ▶ (256.2) *Use of Generative AI in a History of Mathematics Class*  
**Andrew G Bennett\***, Kansas State University (1203-101-41970)

10:30AM ▶ (256.3) *Undergraduate Student Validation of AI-Generated Proofs*

**Chloe Lewis\***, University of Wisconsin Eau Claire, **Jihye Hwang**, Michigan State University, **Ellah Olson**, University of Wisconsin Eau Claire and **Madison Schwartz**, University of Wisconsin Eau Claire (1203-101-43828)

11:00AM *Text-as-Data in Mathematics Education: Harnessing LLMs to Analyze Student Conversations at Scale*  
▶ (256.4) **Michael Ion**<sup>\*</sup>, University of Michigan (1203-101-45743)

11:30AM *Opportunities for SoTL in NSF Undergraduate Education Programs*  
(256.5) **Michael J. Ferrara**<sup>\*</sup>, National Science Foundation and **Patrice Waller**, National Science Foundation (1203-97-43508)

***(257) AMS Special Session on Sparse Graphs: Colorings, Randomness, and Ramsey Theory, I***

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FRIDAY, JANUARY 10 9:00AM–12:00PM **Tahoma 5, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Abhishek Dhawan**, Georgia Institute of Technology  
**James Anderson**, Georgia Institute of Technology

9:00AM *On orientations with forbidden out-degrees*  
▶ (257.1) **Owen Henderschedt**<sup>\*</sup>, Auburn University and **Jessica McDonald**, Auburn University (1203-05-42148)

9:30AM *Scaling window for 3-colorability in triangle-free graphs*  
▶ (257.2) **Clayton Mizgerd**<sup>\*</sup>, University of Illinois Chicago, **Will Perkins**, Georgia Institute of Technology and **Yuzhou Wang**, Georgia Institute of Technology (1203-05-40801)

10:00AM *Strong spatial mixing for colorings on trees and sampling applications*  
▶ (257.3) **Zongchen Chen**, Buffalo, **Kuikui Liu**, University of Washington, **Nitya Mani**<sup>\*</sup>, Massachusetts Institute of Technology and **Ankur Moitra**, Massachusetts Institute of Technology (1203-05-36584)

10:30AM *Coffee Break*

11:00AM *Inducibility of rainbow graphs*  
▶ ♦ (257.5) **Emily Cairncross**<sup>\*</sup>, University of Illinois Chicago, **Clayton Mizgerd**, University of Illinois Chicago and **Dhruv Mubayi**, University of Illinois Chicago (1203-05-40805)

11:30AM *Proper rainbow saturation for cycles, paths, and cliques*  
(257.6) **Dustin Baker**, Iowa State University, **Enrique Gomez-Leos**, Iowa State University, **Anastasia Halfpap**, Iowa State University, **Emily Heath**<sup>\*</sup>, California State Polytechnic University, Pomona, **Ryan R. Martin**, Iowa State University, **Joe Miller**, Iowa State University, **Alex Parker**, Iowa State University, **Hope Pungello**, Iowa State University, **Coy Schwieder**, Iowa State University and **Matthew Nicholas Veldt**, Iowa State University (1203-05-44186)

***(258) AMS-MAA-SIGMAA Special Session on Exemplar Mathematics Departments Supporting PK-12 Mathematics Teachers, I***

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FRIDAY, JANUARY 10 9:00AM–12:00PM **Chelan 2, Level 2, Seattle Convention Center Arch at 800 Pike**

Organizers: **Yvonne Lai**, University of Nebraska Lincoln  
**Lindsey Henderson**, University of Utah  
**Rebecca Hartzler**, Gates Foundation  
**Karen Saxe**, American Mathematical Society  
**Tyler Kloefkorn**, American Mathematical Society

9:00AM *Strengthening the full pipeline: Supporting pre-service and in-service mathematics teachers from school to professional development*  
▶ (258.1) **Emilie Hancock**<sup>\*</sup>, Central Washington University and **Dominic Klyve**, Central Washington University (1203-97-44688)

9:30AM *UNL Math Circles: connecting high schoolers across Nebraska to the UNL Math Department*  
▶ ♦ (258.2) **Jack Jeffries**, University of Nebraska and **Cleve Young**<sup>\*</sup>, University of Nebraska (1203-97-44235)

10:00AM *Scaling Success: The Math Matrix and Teacher Development*  
(258.3) **Zandra de Araujo**<sup>\*</sup>, University of Florida Lastinger Center (1203-97-45922)

10:30AM *Alliance of Indigenous Math Circles: Encompassing All Learners*  
▶ ♦ (258.4) **Tatiana Dezbah Shubin**<sup>\*</sup>, San Jose State University, Alliance of Indigenous Math Circles and **Donna Lee Fernandez**, Alliance of Indigenous Math Circles (1203-101-45808)

11:30AM *Discussion*

***(259) ASL Invited Address - Maria-Florina Balcan, Carnegie Mellon University***

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FRIDAY, JANUARY 10 9:00AM–10:00AM **2A, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizer: **David Reed Solomon**, University of Connecticut

9:00AM *Machine Learning Theory: New Challenges and Connections*  
▶ (259.1) **Maria-Florina Balcan**<sup>\*</sup>, Carnegie Mellon University (1203-68-42411)

***CANCELLED Professional Enhancement Program (PEP) 3A: Mentoring for Equity: Accounting for Identity and Culture in Our Most Important of Relationships***

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FRIDAY, JANUARY 10 9:00AM–11:00AM **Willow A, Second Floor, Sheraton Grand Seattle**

Organizers: **Michael Dorff**, Brigham Young University  
**Emily Moore**, University of Oregon  
**Aris Winger**, Georgia Gwinnett College  
**Abbe Herzig**, American Mathematical Society

***Exhibits and Book Sales***

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FRIDAY, JANUARY 10 9:00AM–5:00PM Hall 4A, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

***JMM Networking Center - Skybridge***

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FRIDAY, JANUARY 10 9:00AM–5:00PM Hall 4D - Skybridge, Level Four, Seattle Convention Center Arch at 705 Pike

JMM Networking Center - Skybridge

Organizer: **AMS Meetings Department**, American Mathematical Society

***JMM Networking Center - Tahoma Foyer***

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FRIDAY, JANUARY 10 9:00AM–5:00PM Tahoma Foyer, Level Three, Seattle Convention Center Arch at 800 Pike

JMM Networking Center - Tahoma Foyer

Organizer: **AMS Meetings Department**, American Mathematical Society

***(260) MAA-SIAM-AMS Hrabowski-Gates-Tapia-McBay Lecture by Victor Moll, Tulane University***

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FRIDAY, JANUARY 10 9:00AM–10:00AM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

9:00AM *Integral Tales: Some Unexpected Connections*  
▶ (260.1) **Victor H Moll**<sup>\*</sup>, Tulane University (1203-00-35050)

***(261) AMS Special Session on Trustworthy AI Applications Including Machine Learning, PINN, and Inverse Problems, I***

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FRIDAY, JANUARY 10 9:30AM–12:00PM 205, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Taufiqar Khan**, University of North Carolina at Charlotte

**Andrew Pangia**, University of North Carolina at Charlotte

9:30AM *AI Research at the Center for TAIMing AI at Charlotte: accelerated Bayesian inversion using PINN for the forward model*  
▶ (261.1) **Taufiqar Khan**<sup>\*</sup>, University of North Carolina at Charlotte (1203-35-41139)

10:00AM *MS-IMAP - a Multi-Scale Graph Embedding approach for Interpretable Manifold Learning*  
▶ (261.2) **Shay Deutsch**<sup>\*</sup>, Discover, **Lionel Yelibi**, Discover, **Alex Tong Lin**, Discover and **Arjun Ravi Kannan**, Discover (1203-05-45051)

10:30AM *CANCELLED Solving forward and inverse PDE problems on unknown manifolds via physics-informed neural operators*  
▶ (261.3) **Lu Lu**<sup>\*</sup>, Yale University (1203-35-40296)

11:00AM *Deep-learning-assisted real-time algorithms for inverse problems governed by partial differential equations*

▶ (261.4) **Tan Bui-Thanh**<sup>\*</sup>, The University of Texas at Austin (1203-49-40727)

11:30AM *Application of Physics Informed Neural Networks to Directed Energy Bioeffects*  
▶ (261.5) **Jenny Farmer**<sup>\*</sup>, 711th Human Performance Wing, Airman Systems Directorate, Bioeffects Division, University of North Carolina at Charlotte, **Chad Oian**, 711th Human Performance Wing, Airman Systems Directorate, Bioeffects Division and **Taufiqar Khan**, University of North Carolina at Charlotte (1203-68-41274)

***(262) CRM-PIMS-AARMS Invited Address - Wilfrid Gangbo, UCLA***

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FRIDAY, JANUARY 10 9:40AM–10:45AM Ballroom 6C, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Ozgur Yilmaz**, Pacific Institute for the Mathematical Sciences

**Jayadev Athreya**, Pacific Institute for the Mathematical Sciences

**Soumik Pal**, University of Washington

9:40AM *Viscosity Solutions In Non-Commutative Variables*  
▶ (262.1) **Wilfrid Gangbo**<sup>\*</sup>, UCLA (1203-35-36484)

***(263) ASL Invited Address - Anton Bernshteyn, UCLA***

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FRIDAY, JANUARY 10 10:00AM–11:00AM 2A, Level Two, Seattle Convention Center Arch at 705 Pike

Organizer: **David Reed Solomon**, University of Connecticut

10:00AM *Some recent progress in descriptive combinatorics*  
(263.1) **Anton Bernshteyn**<sup>\*</sup>, University of California, Los Angeles (1203-03-42711)

***Exhibitor Presentation Theater***

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FRIDAY, JANUARY 10 10:00AM–5:00PM Hall 4A, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

***SIAM-AMS Hrabowski-Gates-Tapia-McBay Panel on Expanding Access to Mathematics Research Opportunities***

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FRIDAY, JANUARY 10 10:00AM–10:50AM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

This informative session is for undergraduates, graduate students, postdocs, and early faculty. The goal of the session is to uncover effective ways to reach mathematics students and early career mathematicians, including those

who may not have a network of mentors advising them on career opportunities. The panelists and participants will discuss practical actions by individuals and mathematics organizations that can increase access to professional opportunities.

Organizers: **Ricardo Cortez**, Tulane University  
**Victor H Moll**, Tulane University

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***JMM Workshop on Entrepreneurial Mindset in Teaching Mathematics***

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FRIDAY, JANUARY 10 10:30AM–12:00PM 4C-2, Level Four,  
Seattle Convention Center Arch at  
705 Pike

Moderators: **Wojciech K Kossek**, University of Denver  
**Stephanie Salomone**, University of Portland  
**Wojciech K Kossek**, University of Denver

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***SIGMAA Panel: Navigating the Frontier: Statistics, Data Science, and AI in the First Two Years of College***

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FRIDAY, JANUARY 10 10:30AM–12:00PM 4C-4, Level Four,  
Seattle Convention Center Arch at  
705 Pike

The fast-evolving educational landscape, particularly in statistics, data science, and AI, underscores the importance of integrating these subjects in the first two years of college. This panel convenes experts to explore teaching challenges and opportunities, emphasizing early college courses. Attendees will gain insights into curriculum design and teaching methods, preparing students for success in a data-driven society.

Moderators: **Helen Burn**, Highline College, SIGMAA Statistic and Data Science Education  
**Helen Burn**, Highline College, SIGMAA Statistic and Data Science Education  
**Patti Frazer Lock**, St. Lawrence University  
**Jamie Perrett**, Brigham Young University  
**Kelly McConville**, Bucknell University  
**Victor Piercey**, Ferris State University

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***(264) AAAS-AMS Invited Address - Rebecca Willett, University of Chicago***

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FRIDAY, JANUARY 10 10:50AM–11:55AM Ballroom 6C,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

10:50AM *Mathematics in Scientific Machine Learning*  
▶ ◆ **Rebecca Willett**, University of Chicago (1203-92-39276)  
(264.1)

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***CANCELLED AMS Information Session on an Overview of the IGEN Mathematics Initiative***

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FRIDAY, JANUARY 10 11:00AM–12:00PM 4C-3, Level Four,  
Seattle Convention Center Arch at  
705 Pike

The Inclusive Graduate Education Network (IGEN) has partnered with the American Mathematical Society (AMS) to

build a program to bridge the gaps in opportunities that keep underrepresented undergraduates from moving on to graduate school and into post-graduate work in the mathematical sciences. This talk will be an overview of this effort.

Organizers: **Tyler Kloefkorn**, American Mathematical Society  
**Alvina Atkinson**, American Mathematical Society

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***Conversation about Outreach with MathHappens***

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FRIDAY, JANUARY 10 11:00AM–12:00PM Diamond B, First  
Floor, Sheraton Grand Seattle

Let's talk about math learning outside of classrooms! Come share successes, struggles, and questions. Walk away invigorated and with new ideas for spreading joyful, creative, interesting, and compelling math in a variety of contexts and spaces. This conversation will be facilitated by Dr. Christopher Danielson, Director of Math Play at MathHappens Foundation.

Organizers: **Christopher Danielson**, MathHappens Foundation  
**Lauren Siegel**, MathHappens Foundation

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***(265) SIAM Invited Address - Steven Lee***

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FRIDAY, JANUARY 10 11:00AM–12:05PM Ballroom 6E,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizers: **Ernesto Esteves Prudencio**, Sandia National Laboratories  
**Carol Woodward**, Lawrence Livermore National Laboratory

11:00AM *Scientific Machine Learning for Accelerated Discovery and Innovation: A Program Manager's Perspective*  
▶ (265.1) **Steven Lee**, Department of Energy - Office of Science (1203-68-36486)

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***(266) AMS - PME Undergraduate Student Poster Session, I***

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FRIDAY, JANUARY 10 12:30PM–2:00PM Hall 4B, Level  
Four, Seattle Convention Center Arch  
at 705 Pike

Organizers: **Molly Moran**, Colorado College  
**Denise Taunton Reid**, Valdosta State University  
**Chad Awtrey**, Samford University

12:30PM *Group classification up to isomorphism of groups up to order 15*  
▶ ◆ (266.1) **Maggie Ha**, University of Houston Downtown (1203-20-36449)

12:30PM *On Bounds and Diophantine Properties of Elliptic Curves*  
▶ (266.2) **Navvye Anand**, California Institute of Technology (1203-11-36994)

- 12:30PM  
▶ ◆  
(266.3) *Forbidden Posets: Small Posets on Small Lattices*  
**Michael Pilson**<sup>\*</sup>, Carnegie Mellon University, **Laura Prince**<sup>\*</sup>, Clark Atlanta University and **Georgia Mon'A Sanders**<sup>\*</sup>, Clark Atlanta University (1203-06-37127)
- 12:30PM  
▶ ◆  
(266.4) *Loops in 4-Dimensional Spaces*  
**Angela Cai**<sup>\*</sup>, University of Pennsylvania, **Nina Chafee**, Haverford College, **Brooke Lytle**, Vanderbilt University and **Alexandra Vorontsova**, Baruch College (1203-57-37273)
- 12:30PM  
▶ ◆  
(266.6) *On Stacked Algebraically Defined Edge-Colored Graphs*  
**Aaron Christopherson**<sup>\*</sup>, Pomona College, **Zephyr Gilmore**<sup>\*</sup>, Bowdoin College, **Susanne Goldstein**<sup>\*</sup>, Oberlin College, **Christina Hoff**<sup>\*</sup>, Kutztown University, **Brian Kronenthal**, Kutztown University and **Karen B McCreedy**, King's College (PA) (1203-05-37715)
- 12:30PM  
▶ ◆  
(266.7) *VIX Term Structure and Options Trading Strategies*  
**Praise Jesujoba Alayode**<sup>\*</sup>, Coppin State University, **Benjamin Shinkichi Shimabukuro**<sup>\*</sup>, Massachusetts Institute of Technology, **Matthew J Mione**<sup>\*</sup>, University of Miami (FL), **Vladmir Necula**<sup>\*</sup>, Lafayette College and **Mori Schacter**, Emory University (1203-62-37721)
- 12:30PM  
▶ ◆  
(266.8) *The Image of the Newform Dedekind Sum*  
**Evelyne Knight**<sup>\*</sup>, Pomona College, **Carlos Alexov Matos**<sup>\*</sup>, Michigan State University and **Amira Sefidi**<sup>\*</sup>, The University of Texas at Austin (1203-11-37727)
- 12:30PM  
▶ ◆  
(266.9) *On the Intersection of Springer Fiber Components*  
**Jan Zachary Fedyszyn**<sup>\*</sup>, Brown University, **Lia M McGrath**<sup>\*</sup>, St. John's College and **Claire Alise Runyan**<sup>\*</sup>, University of South Carolina (1203-14-37732)
- 12:30PM  
▶ ◆  
(266.10) *Predictive Modeling of Lower-Level English Club Soccer Using Crowd-Sourced Player Valuations*  
**Joshua Brown**<sup>\*</sup>, Ursinus College, **Yutong Bu**<sup>\*</sup>, Emory University, **Zachary Cheesman**<sup>\*</sup>, Bowdoin College and **Benjamin Orman**<sup>\*</sup>, Grinnell College (1203-102-37926)
- 12:30PM  
▶ ◆  
(266.11) *An Analysis of the Application of Ranking Methods to Bareback Riding*  
**Mia Adler**<sup>\*</sup>, Pomona College, **Ford McDill**<sup>\*</sup>, Wesleyan University, **Tiffanie Ng**<sup>\*</sup>, Kenyon College and **Will Paz**<sup>\*</sup>, Miami University (1203-102-37927)
- 12:30PM  
▶ ◆  
(266.12) *Instability of anchored spirals in geometric curve evolution*  
**Nathan Mihm**<sup>\*</sup>, University of Minnesota Twin Cities, **Alice Xu**<sup>\*</sup>, Rice University and **Xiaoxing Yu**<sup>\*</sup>, Pomona College (1203-35-37954)
- 12:30PM  
▶ ◆  
(266.13) *Modeling Nitrogen Dynamics in a Potted Plant System to Elucidate Endophyte Effect in Poplar*  
**Carter Corcoro**<sup>\*</sup>, University of Washington (1203-92-38104)
- 12:30PM  
▶ ◆  
(266.14) *Variations of Wilson's theorem and an efficient algorithm for modular factorial*  
**Manit Gupta**<sup>\*</sup>, DuPont Manual High School (1203-11-38120)
- 12:30PM  
▶ ◆  
(266.15) *Boundedness and periodicity in cumulative subtraction game variants*  
**Tanmay Kulkarni**<sup>\*</sup>, Eastside Preparatory School and **Urban Larsson**, Department Of Industrial Engineering & Operations Research at Indian Institute of Technology Bombay (1203-91-38643)
- 12:30PM  
▶ ◆  
(266.16) *More results on stack-sorting for set partitions*  
**Samanyu Ganesh**<sup>\*</sup>, The Westminster Schools, **Lanxuan Xia**<sup>\*</sup>, St. Mark's School and **Bole Ying**<sup>\*</sup>, Lower Merion High School (1203-05-38719)
- 12:30PM  
▶ ◆  
(266.17) *Mathematical Modeling of  $\text{Pseudomonas aeruginosa}$  Quorum Sensing*  
**Aleksandra Gavrilova**<sup>\*</sup>, Denison University, **Winn Gillen**, University of Vermont, **Brendan Shrader**, University of Central Florida, **Sam Brown**, Georgia Institute of Technology and **Rachel Kuske**, Georgia Tech (1203-92-38902)
- 12:30PM  
▶ ◆  
(266.18) *Geometric Structure of Lattice Triangles with 3 Boundary Points and Collinear Interior Lattice Points*  
**Dana Paquin**, California Polytechnic State University, **Elli Sumera**<sup>\*</sup>, California Polytechnic State University and **Tri Tran**, California Polytechnic State University (1203-06-38957)
- 12:30PM  
▶ ◆  
(266.19) *Subgroup Formation Time Incorporating Prestige in Team Assembly Using Agent-Based Modeling*  
**Yul Kim**<sup>\*</sup>, Georgia Institute of Technology (1203-91-38986)
- 12:30PM  
▶ ◆  
(266.20) *Busy Beaver problem*  
**Owen Xuan**<sup>\*</sup>, Lakeside School (1203-00-39106)
- 12:30PM  
▶ ◆  
(266.21) *The Davenport Constant and Automorphically Equivalent Elements*  
**Rachel Chen**<sup>\*</sup>, Marlborough School, **Rohan Garg**<sup>\*</sup>, Amador Valley High School and **Arjun Agarwal**<sup>\*</sup>, Jesuit High School (1203-20-39121)
- 12:30PM  
▶ ◆  
(266.22) *Parallel Chip-Firing Games on Directed Graphs*  
**Daniel Wang**<sup>\*</sup>, Lakeside School, **Michael Li**<sup>\*</sup>, University High School and **David Ji**<sup>\*</sup>, Montgomery High School (1203-05-39140)
- 12:30PM  
▶ ◆  
(266.23) *Bulk and Edge Asymptotics in the Laguerre Ensemble Through Schur Measures*  
**Andy Jay Gu**<sup>\*</sup>, University of Southern California (1203-60-46566)
- 12:30PM  
▶ ◆  
(266.24) *Enumerating pattern-avoiding permutations by cycle*  
**Mat Taylor**<sup>\*</sup>, University of Texas at Tyler and **Martha Du Preez**<sup>\*</sup>, Baylor University (1203-05-39216)
- 12:30PM  
▶ ◆  
(266.25) *Comparing Approaches to Generative AI Molecular Design in Early Drug Discovery*  
**David Baron**<sup>\*</sup>, Williams College, **Ellen Li**, Imperial College London, **Sophia Pi**, Northwestern University and **Walter Virany**,

- University of Colorado Boulder (1203-92-39238)
- 12:30PM *Analysis of an Optimal Insulation Problem for Conducting Bodies*  
▶ (266.26) **Benjamin August Lyons\***, Rose-Hulman Institute of Technology, **Ephraim Ruttenberg\***, University of Maryland, Baltimore County and **Nicholas Zitzelberger\***, Oregon State University (1203-49-39274)
- 12:30PM *Deep Generative Approaches to Network Science for Social System Simulations*  
▶ (266.27) **Miontranese Green\***, California State University, Long Beach, **Amiri Hayes\***, New Jersey Institute of Technology, **Siyang Ding\***, Barnard College and **Mariia Sinkevich\***, University of Oxford (1203-91-39295)
- 12:30PM *Lewis Carroll's Triangle Problem on Lattices*  
▶ (266.28) **Victor Alexander Norton\***, Carnegie Mellon University and **Abigail Lindsey Summers\***, Baylor University (1203-05-39306)
- 12:30PM *Structural Properties of Graphs and the Universal Difference Property*  
▶ (266.29) **Able Martinez\***, Colorado Mesa University, **Patrick McHugh\***, Carnegie Mellon University, **Jenna Rogers\***, The University of Texas at Tyler and **Remi Kayab Salinas Schmeis\***, New Mexico State University (1203-05-39337)
- 12:30PM *Optimal Diffusion Kalman Filter for Lunar Time Synchronization*  
▶ ◆ (266.30) **Riley Paddock\***, UCSB, **Jashvi Desai\***, Princeton University, **Madhavi Prakash\***, University of California Berkeley and **Leah Dichter\***, Bowdoin College (1203-94-39381)
- 12:30PM *Developing Mathematical Intuition with Algebraically-Informed Neural Networks*  
▶ ◆ (266.31) **Lucas Larid\***, Northeastern University, **Circe Hsu\***, Northeastern University and **Robin Walters\***, Northeastern University (1203-68-39542)
- 12:30PM *Space - Filling Curves Over Finite Fields*  
▶ (266.32) **Cedrica J Samuels\***, CUNY Hunter College (1203-11-39610)
- 12:30PM *On the use of neural networks for transfer function approximation for precise motor control*  
▶ (266.33) **Shreya Jha\***, Georgia Institute of Technology, **Shaymaa Mahmoud\***, American University in Cairo, **Michelle Yeasol Bang\***, Oregon State University, **Suleyman Emre Isik\***, University of Cambridge, **Chunyang Liao\***, University of California Los Angeles and **Srilakshmi Pattabiraman\***, UIUC, Analog Devices Inc. (1203-93-39631)
- 12:30PM *Key Hubs and Connectivity Patterns in the Healthy Brain: A Linear Algebra and Graph Theory Framework*  
▶ (266.34) **Sima Ahsani\***, Washington and Lee University, **Ryan Andrew Bascom\***, Washington and Lee University, **Van Thao Nguyen\***, Washington and Lee University, **Dias Shymbay\***, Washington and Lee University and **Zahra**
- Sedigi-Maman\***, Adelphi University (1203-05-39664)
- 12:30PM *Non-Intrusive Parallel-in-Time Solvers for Partial Differential Equations*  
▶ (266.35) **Margaret Shaohua Luo\***, UC San Diego, **Bryan Li\***, UC Berkeley, **Daniel Agraz Vallejo\***, CETYS University and **Tran Duy Anh Le\***, University of Rochester (1203-65-39701)
- 12:30PM *Smart Language Agents in Real-World Planning*  
▶ ◆ (266.36) **Annabelle Miin\***, Independent Researcher and **Timothy Wei\***, Independent Researcher (1203-68-39775)
- 12:30PM *Compute Affine Model for  $SK_9S$  Dessin*  
▶ (266.37) **Ruizhen Liu\***, University of Toronto and **Yanshu Wang\***, Nankai University (1203-11-39848)
- 12:30PM *Bijection Two Constructions of 4-Manifolds with  $b_2=1$*   
▶ (266.38) **Eric Shen\***, Harvard University (1203-57-40000)
- 12:30PM *Reticulate leaf venation in *Pilea peperomioides* is a Voronoi diagram*  
▶ (266.39) **Elijah Blum\***, Cornell University (1203-92-40190)
- 12:30PM *Arithmetic Connections to Mathieu Moonshine in Weight 3/2*  
▶ (266.40) **Wade Ian Twyford\***, UC Berkeley and **Manon Bedou\***, UC Berkeley (1203-11-40213)
- 12:30PM *Time Series Analysis of Monthly Highest Temperatures and Average Humidity in South Georgia (2018-2024)*  
▶ (266.41) **Leslie Dawn Hunt\***, Valdosta State University (1203-90-40328)
- 12:30PM *Early State Exclusion in Quantum Spin Chains*  
▶ (266.42) **Sara A Costa\***, The University of Hartford, **Caleb Findley\***, University of Texas at Arlington and **Kai Zuang\***, Brown University (1203-81-40336)
- 12:30PM *Permutations, braids, and breaking surfaces*  
▶ (266.43) **Will Jackson Bender\***, Haverford College, **Anvaya Shiney-Ajay\***, University of Minnesota and **Maia Walzer\***, Harvard University (1203-55-40367)
- 12:30PM *CAACS: A *Carbon Aware* Ant Colony System*  
▶ (266.44) **Marina Lin\***, MIT PRIMES-USA and **Laura P. Schaposnik\***, University of Illinois at Chicago (1203-90-40699)
- 12:30PM *Local and global approaches for predicting week-to-week NFL outcomes*  
▶ (266.45) **Journey Keen\***, University of Tennessee, Knoxville and **Anh-Thai Le\***, Yale University (1203-90-40733)
- 12:30PM *Explicit Formula for Spanning Tree Enumerator of Descendants Of a Complete Graph*  
▶ (266.46) **Sheng-Chang Chen\***, California State University Sacramento, **Shivjyot Brar\***, California State University Sacramento, **Sayonita Ghosh Hajra\***, California State University Sacramento and

- Santosh Kandel**, California State University Sacramento (1203-05-40754)
- 12:30PM  
▶ (266.47) *Transcending the Alternating Harmonic Series*  
**Hannah Rachel Dempsey**<sup>\*</sup>, Oregon State University and **Vincent Nguyen**<sup>\*</sup>, University of California Los Angeles (1203-40-40756)
- 12:30PM  
▶ (266.48) *Vertex Minimal Graphs with Automorphism Groups of Order  $pq$*   
**Alya Lemus**, New York University, **Tina Brewer**<sup>\*</sup>, University of Northern Colorado and **Alex Joshua Holtzman**, Towson University (1203-05-40898)
- 12:30PM  
▶ ◆ (266.49) *Classifying Commodities Using the Signature Method*  
**Yasutora Ito**<sup>\*</sup>, Worcester Polytechnic Institute, **Kathleen Shiffer**<sup>\*</sup>, Swarthmore College and **Adam Mullaney**<sup>\*</sup>, Worcester Polytechnic Institute (1203-91-40920)
- 12:30PM  
▶ (266.50) *Searching for Points on Projective Curves over Number Fields*  
**Jacob Mayle**, Wake Forest University, **Jeremy A. Rouse**, Wake Forest University and **Flora Yi**<sup>\*</sup>, Wake Forest University (1203-11-41016)
- 12:30PM  
▶ (266.51) *Patterns in the Stable  $sl(N)$  Homology of Torus Knots*  
**Rohan Harjeet Dhillon**<sup>\*</sup>, Massachusetts Institute of Technology PRIMES-USA, Lakeside School (1203-57-41207)
- 12:30PM  
▶ ◆ (266.52) *Markowitz Portfolio Theory: The Addition of Alternative Risk Measures*  
**Sean-Paul Billups**<sup>\*</sup>, The Ohio State University and **Sahas Beeravelli**<sup>\*</sup>, The Ohio State University (1203-49-41289)
- 12:30PM  
▶ (266.53) *On the existence of a balanced vertex in geodesic nets with three boundary vertices*  
**Duc Toan Nguyen**<sup>\*</sup>, Texas Christian University (1203-53-41292)
- 12:30PM  
▶ ◆ (266.54) *Numerical Analysis of the Riemann Problem for a Cosmological  $2 \times 2$  Balance System*  
**Nigel Keyser**<sup>\*</sup>, Department of Mathematics, The Ohio State University, **Griffin Paddock**<sup>\*</sup>, Department of Mathematics, Virginia Tech, **Camden Tumbleston**<sup>\*</sup>, Department of Mathematics, North Carolina State University and **Sara Wilson**<sup>\*</sup>, Department of Mathematics, University of Pittsburgh (1203-35-41582)
- 12:30PM  
*OPEN*
- 12:30PM  
▶ ◆ (266.56) *Ruled Surfaces in Virtual Reality*  
**Bella Villarreal**<sup>\*</sup>, Grinnell College and **Boston Gunderson**<sup>\*</sup>, Grinnell College (1203-14-41679)
- 12:30PM  
▶ ◆ (266.57) *On the Stability of the Euler Characteristic Transform*  
**Jasmine George**<sup>\*</sup>, University of Dayton, **Oscar Lledo Osborn**, Hamilton College and **Messiah Ridgley**, Brandeis University (1203-55-41683)
- 12:30PM  
▶ ◆ (266.58) *Evaluation and Improvement of Machine Learning Based Parameterizations for the Variability in Vertical Wind Velocity*
- 12:30PM  
▶ (266.59) *Toroidal Embeddings of Non-Intrinsically-Linked Graphs*  
**Nathan Hall**<sup>\*</sup>, Occidental College (1203-54-41798)
- 12:30PM  
▶ ◆ (266.60) *Optimizing Clinical Trials with Bayesian Dynamic Borrowing*  
**Emanuel Ayala López**<sup>\*</sup>, The University of Utah, **Ming Wee Goh**, National University of Singapore, **Naman Agrawal**, National University of Singapore and **Wing Yan Yau**, Hong Kong University of Science and Technology (1203-62-41836)
- 12:30PM  
▶ (266.61) *A multi-omic approach to uncover enhancer-gene interactions in the human brain*  
**Sophia Yan**<sup>\*</sup>, Broad Institute of MIT and Harvard (1203-92-41859)
- 12:30PM  
▶ ◆ (266.62) *Using Topological Data Analysis to Understand Biological Invasions*  
**Will Ethan Bales**<sup>\*</sup>, Loyola University Chicago, **Ramsay Dane Barlow**<sup>\*</sup>, Loyola University Chicago and **Carmen Rovi**, Loyola University Chicago (1203-55-42018)
- 12:30PM  
▶ (266.63) *Novel Supervised and Unsupervised Spatial Clustering with Graph Neural Networks*  
**Aidan Gao**<sup>\*</sup>, MIT PRIMES (1203-68-42061)
- 12:30PM  
▶ (266.64) *Sparse Autoencoders for Reinforcement Learning*  
**Coleman Duplessie**<sup>\*</sup>, MIT PRIMES Program (1203-68-42077)
- 12:30PM  
▶ ◆ (266.65) *Cospectral Constructions for the Exponential Distance Matrix*  
**Ori Salim Friesen**<sup>\*</sup>, Macalester College, **Cecily Kolko**<sup>\*</sup>, Smith College, **Sarah Zaske**<sup>\*</sup>, Grand Valley State University and **Amy Louise Zeigler**<sup>\*</sup>, Augustana College (1203-05-42159)
- 12:30PM  
▶ (266.66) *Learning Feasible States with QAOA and  $m$ -QAOA for Constrained Optimization*  
**Alexander Delise**<sup>\*</sup>, Department of Mathematics, Florida State University, **Andrew Del Real**, Department of Computer Science, Carthage College, **Anthony Wilkie**, Department of Industrial and Systems Engineering, University of Tennessee, Knoxville and **James Ostrowski**, Department of Industrial and Systems Engineering, University of Tennessee, Knoxville (1203-81-42185)
- 12:30PM  
▶ ◆ (266.67) *Modeling Dynamics of Platelet-like Particles under Ultrasound Stimulation for Wound Healing Applications*  
**Jacob J. Fingerma**<sup>\*</sup>, University of California Santa Barbara, **Makenna M. Greenwalt**<sup>\*</sup>, University of Oregon, **John M. Miller**<sup>\*</sup>, North Carolina State University, **Hope A. Steen**<sup>\*</sup>, New College of Florida, **Julia Sanger**, North Carolina State University and **Mansoor A.**

- Haider**, Dept. of Mathematics, North Carolina State University (1203-35-42288)
- 12:30PM *Tutorial on Information Obtained from the First Derivative Graph*  
▶ (266.68) **Matthew James Swaringen**<sup>\*</sup>, Texas A&M and **Philip B Yasskin**, Department of Mathematics, Texas A&M University (1203-97-42289)
- 12:30PM *Computational Prediction of Wall Sheer Stress with 1D Fluid Dynamics Model*  
▶ (266.69) **Lucy A Wilson**<sup>\*</sup>, Bryn Mawr College, **Michael I Kriel**<sup>\*</sup>, Christopher Newport University, **Erin A Jones**<sup>\*</sup>, University of Tennessee at Chattanooga, **Florian Meister**<sup>\*</sup>, Reed College and **Grant Harkins**<sup>\*</sup>, Davidson College (1203-92-42297)
- 12:30PM *Applied and Numerical Aspects for Nonlocal Initial Value Problems*  
▶ (266.70) **Anders Bahrami**<sup>\*</sup>, Texas A&M University, **Zhekai Liu**<sup>\*</sup>, Jilin University, **Dianlun Luo**<sup>\*</sup>, Columbia University, **Diego Rubio Garcia**<sup>\*</sup>, Princeton University and **Oleksii Yeromenko**, Constructor University Bremen (1203-65-42329)
- 12:30PM *An Efficient Semi-Real-Time Algorithm for Path Planning in the Hamilton-Jacobi Formulation*  
▶ (266.71) **Kyle Polage**<sup>\*</sup>, University of Washington (1203-49-42352)
- 12:30PM *An Upper Bound on Higher Moments of Newform Dedekind Sums*  
▶ (266.72) **John Layne**<sup>\*</sup>, University of Virginia (1203-11-42466)
- 12:30PM *Homomesy and Parking Functions*  
▶ ◆ (266.73) **Cyrus Young**<sup>\*</sup>, University of California, Irvine and **Marvin Gandhi**<sup>\*</sup>, Northeastern University (1203-05-42489)
- 12:30PM *Modeling the Effectiveness of Facial Cleanliness to Combat Trachoma*  
▶ (266.74) **Mark Ira Donguila Galang**<sup>\*</sup>, University of Guam, **Liam Soaladoab McManus**<sup>\*</sup>, University of Guam, **Taisei Tagami**, St. John's School, **Angel Bernabe Velasco**<sup>\*</sup>, University of Guam, **Leslie Aquino**, University of Guam, **Hyunju Oh**, University of Guam, **Dewey Taylor**, Virginia Commonwealth University and **Jan Rychtar**, Virginia Commonwealth University (1203-91-42506)
- 12:30PM *A Quadratic Penalty and Moreau Envelope Descent Algorithm for Constrained Global Minimization*  
▶ ◆ (266.75) **Jordan Banks**<sup>\*</sup>, Howard University and **Stephanie Wang**<sup>\*</sup>, University of Rochester (1203-65-42507)
- 12:30PM *EFFECTIVE SUPPORT, DIRAC COMBS, AND SIGNAL RECOVERY*  
▶ ◆ (266.76) **Giovanni Garza**<sup>\*</sup>, University of Rochester and **Nate Shaffer**<sup>\*</sup>, University of Rochester (1203-42-42509)
- 12:30PM *Randomization Techniques for Low Discrepancy Sequences*  
▶ (266.77)
- 12:30PM *Theoretical Aspects for Nonlocal Initial Value Problems*  
▶ ◆ (266.78) **Zi Qian Chan**<sup>\*</sup>, The University of Cambridge, **Riccardo Formenti**<sup>\*</sup>, Università degli Studi di Milano, **Kaleb Trice**<sup>\*</sup>, Yale University and **Denisa Vlasceanu**<sup>\*</sup>, The University of Michigan - Ann Arbor (1203-45-42544)
- 12:30PM *Worst-case Error Bounds for Online Learning of Smooth Functions*  
▶ (266.79) **Weian Xie**<sup>\*</sup>, The Hotchkiss School (1203-68-42547)
- 12:30PM *Mathematics Behind Piano Tuning*  
▶ (266.80) **Mason Huffman**<sup>\*</sup>, Florida Gulf Coast University (1203-00-42595)
- 12:30PM *Improving Energy Harvesting Using a Coupled Vibro-Impact System*  
▶ (266.81) **Arnav Garg**<sup>\*</sup>, New York University and **Nathan Samuel Hasegawa**<sup>\*</sup>, Harvey Mudd College (1203-37-42643)
- 12:30PM *Minimum Polyform Puzzle*  
▶ (266.82) **D. M. Condon**, St. Lawrence University, **Eli B. Dugan**<sup>\*</sup>, Williams College, **Laney M. Goldman**, Harvey Mudd College and **Emily R. Williams**, Amherst College (1203-05-42753)
- 12:30PM *Housing Affordability Index: A Multivariable Regression Analysis*  
▶ ◆ (266.83) **Celine Makarem**<sup>\*</sup>, Babson College (1203-62-42817)
- 12:30PM *An Extension of Anti-Ramsey Problems*  
▶ (266.84) **Paul Hamrick**<sup>\*</sup>, University of North Carolina at Chapel Hill and **William Lee**<sup>\*</sup>, Stony Brook University (1203-05-42894)
- 12:30PM *Efficacy of community groups as a social prescription for senior health - A Random Effects Probit Analysis of the COVID-19 lockdown*  
▶ ◆ (266.85) **Ryka C. Chopra**<sup>\*</sup>, Mission San Jose High School (1203-91-42946)
- 12:30PM *Demazure product and hopping in type  $SDS$*   
▶ (266.86) **Darren Han**<sup>\*</sup>, Westwood High School, **Michelle Huang**, St. Andrews Episcopal School, **Benjamin Keller**, San Marcos High School, **Suho Oh**, Texas State University and **Jerry Zhang**<sup>\*</sup>, Bellaire High School (1203-05-42991)
- 12:30PM *Generalized Partition Identities and Fixed Perimeter Analogues*  
▶ (266.87) **Gabriel Paul Gray**<sup>\*</sup>, University of Dayton, **Emily Payne**<sup>\*</sup>, University of Texas Rio Grande Valley, **Ren Watson**<sup>\*</sup>, University of Texas At Austin and **Holly Swisher**, Oregon State University (1203-11-42997)
- 12:30PM *Sudoku Polynomials*  
▶ ◆ (266.88) **John Robert Estrada**<sup>\*</sup>, University of Guam, **Ash David Kiel**<sup>\*</sup>, Willamette University, **Anastasia Smith**<sup>\*</sup>, Lewis and Clark College, **Jan Rychtar**, Virginia Commonwealth University, **Dewey Taylor**, Virginia Commonwealth

- University and **Raymond Paulino**, University of Guam (1203-05-43120)
- 12:30PM **▶** (266.89) *Advanced EEG Signal Analysis for Alzheimer's: Integrating Orthogonal Matrices, Deep Learning, and Explainable AI for Improved Diagnosis*  
**Qiaoxi Yang\***, Beloit College (1203-92-43216)
- 12:30PM **▶** (266.90) *Generating Spanning Trees and Their Orbits up to Graph Automorphism*  
**Mithra Vamshi Karamchedu\***, Harvey Mudd College (1203-05-43239)
- 12:30PM **▶** (266.91) *Parking Functions with Restricted Preferences*  
**Alan Kappler\***, Harvey Mudd College, **Jayden Thadani\***, Harvey Mudd College, **Michael E. Orrison**, Harvey Mudd College and **Peter Kagey**, Cal Poly Pomona (1203-05-43243)
- 12:30PM **▶** ♦ (266.92) *Identifying Diurnal and Seasonal Cycles in Aerosol Data Using Gaussian Processes*  
**Elijah W Valverde\***, San Francisco State University and **Allison C Aiken**, Los Alamos National Laboratory (1203-60-43262)
- 12:30PM **▶** ♦ (266.93) *Neural Network Pipeline for Systems Biology: Solving the Notch Signaling Pathway*  
**Alex Huang\***, The Harker School, **Kartik Ramachandrula**, Brookfield Central High School and **Agniv Sarkar**, Oxford University (1203-34-43280)
- 12:30PM **▶** (266.94) *Rank Bounds in Quadratic Twist Families of Abelian Varieties*  
**Kaivalya Rajesh Kulkarni\***, Princeton University (1203-11-43411)
- 12:30PM **▶** ♦ (266.95) *Stochastic Simulations of  $\{C.~difficile\}$  Spread in Assisted Living Facilities*  
**Alli Brophy\***, Winthrop University, **Andres Castellanos\***, Sonoma State University, **Bryce Iversen\***, Sonoma State University, **Danielle Murphy\***, University of California, Berkeley, **Austin Kind**, Lewis University, **Matthew Senese**, University of Notre Dame, **Brittany Stephenson**, Lewis University and **Cara Sulyok**, Lewis University (1203-92-43464)
- 12:30PM **▶** ♦ (266.96) *A Mathematical Model of  $\{Clostridioides~difficile\}$  Transmission in Long-Term Care Facilities*  
**Priscilla Doran\***, Bryan College, **Natsuka Hayashida\***, Brown University, **Kristen Joyner\***, University of Tennessee, Knoxville, **Grace Moberg\***, Colby College, **Austin Kind**, Lewis University, **Matthew Senese**, University of Notre Dame, **Brittany Stephenson**, Lewis University and **Cara Sulyok**, Lewis University (1203-37-43484)
- 12:30PM **▶** (266.97) *HALFSPACE REPRESENTATIONS OF SHORTEST PATH POLYTOPES ON TREES*  
**Amer Karan Goel\***, University of Michigan (1203-62-43555)
- 12:30PM **▶** (266.98) *Pointed Quandle Coloring Quivers of Linkoids*  
**Max Jeffrey Klivans\***, Hamilton College and **Jose H Cenicerros**, Hamilton College (1203-57-43686)
- 12:30PM **▶** (266.99) *Deep Learning Models for Near-Term, Iterative Stream Temperature Forecasting*  
**Jack Ryan Bielawa\***, Dr. Hum Nath Bhandari, Dr. Joel Singley (1203-92-43726)
- 12:30PM **▶** (266.100) *Constructing Balanced Walls in Random Groups*  
**Yang Tan\***, Carleton College, **Nhi Luong\***, Carleton College, **Xingyi Zhang\***, Carleton College, **Lee Li\***, Carleton College, **Nathaniel Cheng\***, Carleton College and **MurphyKate Montee**, Carleton College (1203-20-43747)
- 12:30PM **▶** (266.101) *Collection of Results on the Connectivity of  $n$ -tuple graphs*  
**Ian James Wilson\***, N/A, **Erin Margaret Hopper\***, N/A and **Deven Platt\***, N/A (1203-05-43869)
- 12:30PM *OPEN*
- 12:30PM **▶** (266.103) *Modeling Fatality Data using Integer Valued Time Series*  
**Fiona Isabella Romanoschi\***, University of Texas, Austin, **Adam Ousherovitch\***, University of California, Berkeley, **Natalia Velez-Rios\***, Vassar College and **Madeline Mariano\***, Rochester Institute of Technology (1203-62-43965)
- 12:30PM **▶** (266.104) *Enhancing Spectral Density Estimation Using a Local Quadratic Fitting Method*  
**Xiaoman Xu\***, Smith College (1203-60-43996)
- 12:30PM **▶** ♦ (266.105) *Machine-Learning Diffusion for Computational Fluid Dynamics*  
**Kristopher Ramirez\***, California State University, Stanislaus (1203-76-43998)
- 12:30PM **▶** (266.106) *Cell-Cell Communication Using Spatial Transcriptomic Data and Causal Inference*  
**Perry Beamer**, North Carolina State University, **Zixuan Cang**, North Carolina State University, **Denis Selyuzhitsky\***, Michigan State University, **Andy Soma**, Lake Superior State University, **Leah Valentiner\***, Wellesley College and **Mingye Wang\***, University of California Los Angeles (1203-92-44037)
- 12:30PM **▶** (266.107) *Analysis of Fibonacci Numbers in *Phyllotaxis**  
**Allan Thomas Newman\***, Indiana State University (1203-92-44043)
- 12:30PM **▶** (266.108) *Exploring Transfer Learning in Automated Exoplanet Classification Using Machine Learning*  
**Jerry Wang\***, Parkland High School (1203-85-44067)
- 12:30PM **▶** (266.109) *A Goldbach Theorem for Group Semidomains*  
**Advait Mopuri\***, MIT PRIMES, **Charles Zhang\***, MIT PRIMES and **Eddy Li\***, MIT PRIMES (1203-11-44077)
- 12:30PM **▶** ♦ (266.110) *Quantum error-correcting codes from generalized Toeplitz graphs*  
**Andreas Vincent Garcia\***, University of Arizona, **Layla Jarrahy\***, Hamilton College and

- Elisaveta Vera Samoylov**<sup>\*</sup>, Dartmouth College (1203-68-44175)
- 12:30PM *Intersecting Psi-classes in the Graphic Tropical Moduli Space  $\mathcal{M}_{g, \Gamma}$*   
▶ (266.111) **Lucien Petit**<sup>\*</sup>, Lewis and Clark College (1203-14-44180)
- 12:30PM *Beekman's Postulate: An Exploration Into a New Method for Counting Tiles in Finite Tilings*  
▶ (266.112) **Sebastian Alexander Neumann**<sup>\*</sup>, United States Military Academy (1203-52-44205)
- 12:30PM *THE REALIZABILITY PROBLEM FOR LINEAR ISOMETRIES AND STEINER OPERADS OVER CYCLIC GROUPS*  
▶ (266.113) **David Cheng**<sup>\*</sup>, University of Michigan Ann Arbor, **Beinuo Guo**<sup>\*</sup>, University of Michigan Ann Arbor, **Haran Mouli**<sup>\*</sup>, university of wisconsin madison and **Bar Roytman**, University of Michigan (1203-55-44213)
- 12:30PM *A Game-Theoretic Model for Mpox in a Urban V. Rural Population*  
▶ (266.114) **Johndeo Celorio Bulatao**, University of Guam, **Ryan Medina Daproza**, University of Guam, **Alexander Greene**<sup>\*</sup>, University of Guam, **Jieqin Lydia Yang**<sup>\*</sup>, Harvest Christian Academy, **Hyunju Oh**, University of Guam, **Leslie Aquino**, University of Guam, **Jan Rychtar**, Virginia Commonwealth University and **Dewey Taylor**, Virginia Commonwealth University (1203-91-44231)
- 12:30PM *Comparative Analyses of the Type D ASEP: Stochastic Fusion and Crystal Bases*  
▶ (266.115) **Erik Brodsky**<sup>\*</sup>, Michigan State University, **Eva Engel**<sup>\*</sup>, Princeton University, **Connor Michael Panish**<sup>\*</sup>, University of Florida and **Lillian Stolberg**<sup>\*</sup>, University of Rochester (1203-81-44232)
- 12:30PM *OPEN*
- 12:30PM *A Graph Theoretic Approach To Studying Gout On Guam*  
▶ ◆ (266.117) **Ricardo Lujan Duenas II**<sup>\*</sup>, University of Guam, **Cindy Gitiri Ruto**<sup>\*</sup>, University of Texas at Austin, **Colin Banico Valencia**<sup>\*</sup>, University of Guam, **Hyunju Oh**, University of Guam, **Jan Rychtar**, Virginia Commonwealth University, **Raymond Paulino**, University of Guam and **Dewey Taylor**, Virginia Commonwealth University (1203-00-44381)
- 12:30PM *A Novel Mathematical Approach for EEG-MEG-Based Brain Computer Interfaces: Dynamic Graph Neural Networks and Feature Extraction for Mental State Assessment*  
▶ (266.118) **Ranyi Dong**<sup>\*</sup>, Beijing Jiaotong University, University of Birmingham, UK (1203-68-44549)
- 12:30PM *Analysis of a Coevolving Networks-based Opioid Epidemic Model*  
▶ (266.119) **Kiera Makenzie Kelly**<sup>\*</sup>, Rochester Institute of Technology (1203-91-44557)
- 12:30PM *Mathematical Modeling of Host Population Dynamics in a Multihost Pathogen System*  
▶ ◆ (266.120) **Maisha Marzan**<sup>\*</sup>, Undergraduate Student, Department of Mathematics and Biology, North Central College, **Gregory Ruthig**, Professor, Department of Biology, North Central College and **Marco V Martinez**, Professor, Department of Math & Actuarial Science, North Central College (1203-92-44565)
- 12:30PM *Reconstruction of radiating point sources from single frequency data in a 2D acoustic waveguide*  
▶ (266.121) **Ashley Song**<sup>\*</sup>, Rice University, **Julia Lewis-Borgia**<sup>\*</sup>, Smith College, **Isabella Garcia**, Marist College, **Thu Le**, Kansas State University, **Nhung Nguyen**, Kansas State University and **Dinh-Liem Nguyen**, Kansas State University (1203-35-44576)
- 12:30PM *Satellite Feature Identification Using 3D Gaussian Splatting-Based Object Detection Ensembles*  
▶ (266.122) **Emma Rose Sandidge**<sup>\*</sup>, Florida Institute of Technology, Florida International University, **Van Minh Nguyen**, Florida Institute of Technology, **Trupti Mahendrakar**, Florida Institute of Technology and **Ryan T White**, Florida Institute of Technology (1203-90-44718)
- 12:30PM *How Complex can Convex Codes be?*  
▶ (266.123) **Parker Abed**<sup>\*</sup>, Creighton University (1203-05-44723)
- 12:30PM *A central limit theorem with explicit Lyapunov exponent and variance for products of 2x2 random non-invertible matrices*  
▶ (266.124) **Audrey Benson**<sup>\*</sup>, Union College, **Hunter Gould**<sup>\*</sup>, Union College, **Phanuel A. Mariano**, Union College, **Grace Newcombe**<sup>\*</sup>, Union College and **Joshua Vaidman**<sup>\*</sup>, Union College (1203-37-44728)
- 12:30PM *Logic and the Waffle Puzzle*  
▶ ◆ (266.125) **Rawin Hidalgo**<sup>\*</sup>, SUNY at Stony Brook, **Sarah Elvira Riaz**<sup>\*</sup>, Loyola University Chicago, **Isaac Hammond**<sup>\*</sup>, University of North Carolina Greensboro, **Jessica Fuchs**<sup>\*</sup>, Lenoir-Rhyne University and **Emily Hoopes Boyd**, Kent State University, Research advisor (1203-03-46575)
- 12:30PM *Improving Auditory EEG Decoding with Time-Frequency Analysis and Shallow Neural Networks*  
▶ (266.126) **Alexander Kei Karbowski**<sup>\*</sup>, Harvard University, **Sophia Xiao**, Emory University, **Dylan Marchlinski**, University of Pennsylvania and **Corinne Orton**, University of Utah (1203-68-44848)
- 12:30PM *Optimal Laplacian Eigenmaps and Geometric Structures*  
▶ ◆ (266.127) **Al Farabie Akanda**<sup>\*</sup>, Haverford College, **August Dym Noë**<sup>\*</sup>, University of California, Santa Cruz, **John Ackerman**, University of Connecticut, **Alexander Teplyaev**, University of Connecticut, **Luke G Rogers**, University of Connecticut and **Bernard Akai Akwei**, University of Connecticut (1203-35-44875)

- 12:30PM  
▶ (266.128) *Power Sums of Primes in Arithmetic Progression*  
**Zhangze Li**<sup>\*</sup>, Ohio State University, **Muhammet Boran**, Yıldız Technical University, **John Byun**, Carleton College, **Steven Joel Miller**, Williams College and **Stephanie Reyes**, Claremont Graduate University (1203-11-44917)
- 12:30PM  
▶ ◆ (266.129) *Mathematical model for phage-bacteria interactions in marine environments*  
**Michaela L Johnson**<sup>\*</sup>, Roger Williams University and **Hasala Senpathy Karunaratne Gallolu Kankanamalage**, Roger Williams University (1203-92-44990)
- 12:30PM  
▶ (266.130) *Pattern avoidance in desarrangements*  
**Chadi Bsila**, Davidson College, **Caroline E. Cox**<sup>\*</sup>, Davidson College, **Anna Scott Hugo**<sup>\*</sup>, Davidson College, **Lindsey Styron**, Davidson College and **Yan Zhuang**, Davidson College (1203-05-45002)
- 12:30PM  
▶ (266.131) *A Generalization of Merton's Investor Problem*  
**Caroline Amelia Borrillo**<sup>\*</sup>, Ohio State University and **William Carvalho**<sup>\*</sup>, Ohio State University, Michigan State University (1203-91-45021)
- 12:30PM  
▶ (266.132) *Replacement dynamics and binary quadratic forms.*  
**Raghav Bhutani**<sup>\*</sup>, University of Illinois at Chicago and **Frederick Saia**, University of Illinois Chicago (1203-11-45062)
- 12:30PM  
▶ (266.133) *Wavelet Based Keystoness Analysis to Classify Potential Scorpion Toxins*  
**Adam Psenicnik**<sup>\*</sup>, Western Connecticut State University (1203-92-45170)
- 12:30PM  
▶ ◆ (266.134) *Deep Learning Techniques for Equity Portfolio Construction, Optimization, and Performance Analysis*  
**Alisa Barbara Barker**<sup>\*</sup>, Roger Williams University and **Hum Nath Bhandari**, Roger Williams University (1203-68-45238)
- 12:30PM  
▶ ◆ (266.135) *A Computerized Search for Integral Unilateral and Equitransitive Tilings by Squares of  $n$  Sizes*  
**Fatima Muniz**<sup>\*</sup>, University of Wisconsin-Oshkosh, **Harmony Monique Vargas**<sup>\*</sup>, California State University, Northridge and **Rachel Jane Villafranca**<sup>\*</sup>, Kean University (1203-52-45318)
- 12:30PM  
▶ (266.136) *Explicit Minimizers for the Divergence Penalized Landau-de Gennes Model in Liquid Crystals*  
**Danny McDonald**<sup>\*</sup>, University of Pennsylvania, **Nathan Singh**, University of California, Davis, **Jinqi Chen**, Tufts University and **Léa Mazzouza**, Université Paris-Saclay (1203-35-45406)
- 12:30PM  
▶ ◆ (266.137) *A Combinatorial Characterization of Newton Polytopes of Dual Schubert Polynomials*  
**Serena An**, MIT, **Katherine Tung**<sup>\*</sup>, Harvard University and **Yuchong Zhang**<sup>\*</sup>, University of Michigan (1203-05-45452)
- 12:30PM  
▶ ◆ (266.138) *Perfect Roman Domination and Bounds on Bondage Number through Edge Removal Preliminary Report*  
**Sophia Child**, Colgate University, **Ava Kerry**<sup>\*</sup>, Miami University and **Nathan Shank**, Moravian University (1203-05-45744)
- 12:30PM  
▶ (266.139) *Pattern-forming fronts in the wake of a parameter ramp*  
**Nilay J. Patel**<sup>\*</sup>, Cornell University, **Kiersten Layne Ratcliff**<sup>\*</sup>, University of Alabama at Birmingham, **Ryan Nolan Goh**, Boston University and **Benjamin Krewson**, Boston University (1203-35-45790)
- 12:30PM  
▶ (266.140) *Continuous Inverse Ambiguous Functions on Lie Groups*  
**Sadman Rahman**<sup>\*</sup>, Undergraduate Student, Department of Mathematics, North Central College, **David J Schmitz**, Professor, Department of Math & Actuarial Science, North Central College and **Anthony Kindness**, Undergraduate Student, North Central College (1203-22-45802)
- 12:30PM  
▶ (266.141) *Hodgkin Huxley Model: The Runge-Kutta Method for Human Membrane*  
**Danielle Vogt**<sup>\*</sup>, Roger Williams University and **Yajni Warnapala**, Roger Williams University (1203-65-45835)
- 12:30PM  
▶ (266.142) *Mathematical Modeling of Immigration and Housing Price Dynamics in Canada: Integrating Game Theory, Stochastic Processes, and Explainable AI for Policy Impact Analysis*  
**Yuwen Zhao**<sup>\*</sup>, University of Toronto (1203-91-45887)
- 12:30PM  
▶ (266.143) *On  $\mathbb{Z}\mathbb{Z}$ -Superstable and Critical Configurations of Chip-Firing Pairs*  
**Zach Benton**<sup>\*</sup>, Stanford University, **Jane Kwak**<sup>\*</sup>, UCLA, **Suho Oh**, Texas State University, **Mateo Torres**<sup>\*</sup>, University of Delaware and **Mckinley Xie**<sup>\*</sup>, Texas A&M University (1203-05-45889)
- 12:30PM  
▶ (266.144) *The effect of natural motion on retinal ganglion cell output*  
**Jared L Noel**<sup>\*</sup>, University of Arkansas, **Zachary Jessen**, Northwestern University Feinberg School of Medicine, **Jared Salisbury**, University of Chicago, **Stephanie Palmer**, University of Chicago and **Gregory Schwartz**, Northwestern University Feinberg School of Medicine (1203-92-45890)
- 12:30PM  
▶ ◆ (266.145) *Counting Zariski dense representations of hyperbolic 3-manifold groups*  
**Ari Isaac Hughes Benveniste**<sup>\*</sup>, Pomona College, **Seojun Lee**<sup>\*</sup>, Yale University, **Jorge Yahel Montes Guzman**<sup>\*</sup>, California State Polytechnic University Pomona, **Adam Snyder Wesley**, Yale University, **Diana Yang**<sup>\*</sup>, Yale University, **Tamunonye A Cheetham-West**, Yale University, **Franco Vargas Pallete**, Yale University and **Andrew Yarmola**, Yale University (1203-57-45893)

- 12:30PM ▶ (266.146) *Modeling and Uncertainty Quantification of Extreme Fatality Occurrence Caused By Tornadoes in the USA*  
**Hallie Nuccio**<sup>\*</sup>, Butler University (1203-62-45894)
- 12:30PM ▶ (266.147) *On Stable Singularity Formation for the Quadratic Wave Equation*  
**Christopher Cecchi**, Grinnell College, Michigan State University, **Joanna Workman**<sup>\*</sup>, Michigan Technological University, Michigan State University and **Sofi Levi**<sup>\*</sup>, Michigan State University (1203-35-45901)
- 12:30PM *OPEN*
- 12:30PM ▶ (266.149) *Dynamic EEG Network Analysis with Graph Neural Networks for ADHD Diagnosis and Emotional Processing Insights*  
**Jing Chang**<sup>\*</sup>, University of Wisconsin Madison (1203-92-45904)
- 12:30PM ▶ (266.150) *CT Image Reconstruction Using Neural Networks*  
**Benjamin Kade Phillips**<sup>\*</sup>, Pennsylvania Western University Clarion, **Emma J Conran**<sup>\*</sup>, Cathage College, **Kailen Bodhi**<sup>\*</sup>, Oregon State University and **Vinisha B Dhayanidhi**<sup>\*</sup>, University of Washington Bothell (1203-68-45918)
- 12:30PM ▶ (266.151) *On  $\$e$ -positivity of cycle chains*  
**Foster Tom**, UC Berkeley, MIT and **Aarush Vailaya**<sup>\*</sup>, Harker School (1203-05-45923)
- 12:30PM ▶ ◆ (266.152) *A Continuation of the Classification of Prime Graphs of  $\$K_4$ -Solvable Groups*  
**Thomas Michael Keller**, Texas State University, **Zachary Martin**<sup>\*</sup>, Willamette University, **Alexa Renner**<sup>\*</sup>, Rose-Hulman Institute of Technology, **Gabriel Fabricio Roca**<sup>\*</sup>, University of Central Florida and **Eric Yu**<sup>\*</sup>, University of Pennsylvania (1203-20-45927)
- 12:30PM ▶ (266.153) *Affine Hecke Algebra and the Subregular  $J$ -ring*  
**Hwisoo Kim**<sup>\*</sup>, Phillips Academy, MIT PRIMES-USA (1203-16-45936)
- 12:30PM ▶ (266.154) *Cops and Robbers on Oriented Graphs*  
**Noah W. Calhoun**, Centre College, **Ashleigh A. Clark**<sup>\*</sup>, University of Tennessee, **Elizabeth Anne Howard**<sup>\*</sup>, Xavier University and **Cassidy S. Kao**<sup>\*</sup>, Barnard College (1203-05-45947)
- 12:30PM ▶ (266.155) *Morrey Conjecture and Iwaniec Conjecture on Specific Classes of Functions*  
**Xiaoxian Chen**<sup>\*</sup>, University of California, Los Angeles (1203-49-45950)
- 12:30PM ▶ (266.156) *Wildfire Containment, Smoke Spread, and Public Health Consequences: A Mathematical Model*  
**Keith Lawrence Corpuz**<sup>\*</sup>, New Jersey City University and **Oluwaseun Falayi**<sup>\*</sup>, New Jersey City University (1203-35-45951)
- 12:30PM ▶ (266.157) *Reversibility in Abstract Machines: A Lambda Calculus Approach*  
**Nate Francis Schwartz**<sup>\*</sup>, Department of Science and Mathematics, Augusta University and **Clément Aubert**, Department of Computer Science, Augusta University (1203-68-45958)
- 12:30PM ▶ (266.158) *Enumerating Maximal Independent Sets in Grid-like Graphs*  
**Levi Axelrod**<sup>\*</sup>, Binghamton University, **Nathan Bickel**<sup>\*</sup>, University of South Carolina, **Anastasia Halfpap**, Iowa State University, **Luke Hawranick**<sup>\*</sup>, West Virginia University, **Alex Parker**, Iowa State University and **Cole Swain**<sup>\*</sup>, University of Montevallo (1203-05-45966)
- 12:30PM ▶ (266.159) *Testing Combinations of Transformers and Deep Learning in Bioinformatics*  
**Jack Foreback**<sup>\*</sup>, Grand Valley State University (1203-68-45968)
- 12:30PM ▶ (266.160) *Modeling Directed Motion In Active Microswimmers*  
**Jake Howard Ballard**<sup>\*</sup>, University of Houston (1203-82-45972)
- 12:30PM ▶ (266.161) *Integer Partitions and Their Tableaux*  
**Millie R Jeske**<sup>\*</sup>, University of Texas at Tyler, **Alessandro Russo**<sup>\*</sup>, Charleston Southern University and **Alessandra Anahi Martinez**<sup>\*</sup>, The University of Texas at Rio Grande Valley (1203-05-46004)
- 12:30PM ▶ ◆ (266.162) *Macaulay Rings and Macaulay Posets*  
**Penelope Beall**<sup>\*</sup>, University of Florida, **Nancy Chen**<sup>\*</sup>, Cornell University and **Kelvin Ma**<sup>\*</sup>, Iowa State University (1203-13-46007)
- 12:30PM ▶ ◆ (266.163) *Causal Inference for ICU Healthcare*  
**Monserath Velez**<sup>\*</sup>, Kean University, **Jack O'Connor**, Winona State University, **Nicholas Della Pesca**, Vassar College and **Rio Baliga**, Rowan University (1203-62-46011)
- 12:30PM ▶ (266.164) *Counting Edge Covers of Chain Graph*  
**Ethan Woudwyk**<sup>\*</sup>, Grand Valley State University (1203-05-46026)
- 12:30PM ▶ (266.165) *The "Lights Out!" Game on Threshold Graphs*  
**Troy Everett Conlay**<sup>\*</sup>, Grand Valley State University (1203-102-46027)
- 12:30PM ▶ (266.166) *Number Sequences Generated by the Edge Covers of Fan Graphs*  
**Marshall E Nicholson**<sup>\*</sup>, Grand Valley State University (1203-05-46028)
- 12:30PM ▶ (266.167) *Stack-sorting with Stacks Avoiding Vincular Patterns*  
**William Zhao**<sup>\*</sup>, Dougherty Valley High School (1203-05-46331)
- 12:30PM ▶ (266.168) *Expansivity on Julia Sets*  
**David Richard Sieg**<sup>\*</sup>, North Carolina State University (1203-37-38971)

- 12:30PM *Uncertainty Quantification of Diffusion Coefficient Estimation*  
▶ (266.169) **Travis McVoy**<sup>\*</sup>, Skidmore College, **Jennifer Zhang**, MIT and **Courtney Francois**, University of Southern Mississippi (1203-62-46032)
- 12:30PM *On the average size of  $\mathbb{Z}^3$ -torsion in class groups of  $\mathbb{Z}_2$  wr  $H$  extensions*  
▶ (266.170) **Hari Ramakrishnan Iyer**<sup>\*</sup>, Princeton University and **Jonas Iskander**, Harvard University (1203-11-44086)
- 12:30PM *An Elementary Method For Fast Modular Exponentiation With Factored Modulus*  
▶ (266.171) **Anay Aggarwal**<sup>\*</sup>, Independent and **Manu Isaacs**, N/A (1203-11-38814)
- 12:30PM *The Game of Toma Todo Made Fair*  
▶ ♦ (266.172) **Giselle Maylee Chavez**<sup>\*</sup>, St. Edward's University (1203-60-46625)
- 12:30PM *Hyperbolic groups have solvable word problem: An accessible proof*  
▶ ♦ (266.173) **Alison Watson**<sup>\*</sup>, Cal Poly SLO, **Vanessa Garcia Sanchez**<sup>\*</sup>, Cal Poly SLO and **Anton Kaul**, Cal Poly SLO (1203-20-46626)
- 12:30PM *A Statistical Analysis of the Impact of Gun Ownership on Mass Shootings in the USA Between 2013 and 2022*  
▶ (266.174) **Madison Daraklis**<sup>\*</sup>, Westminster College (PA), **Cianna Salvatora**, Wellesley College, **Mehul Pol**, The University of Virginia, **Lindsey Johnson**, Westminster College (PA) and **Lucy Kerns**, Youngstown State University (1203-62-40380)
- 12:30PM *Cycles in Toroidal Grid Graphs*  
▶ (266.175) **Marinela Cruz**<sup>\*</sup>, Southern Adventist University (1203-05-46391)
- 12:30PM *Maximizing Full-Length Runs of a Hamiltonian Path in a Cubic Lattice Graph*  
▶ (266.176) **Juan Camilo Alvarez-Wilches**<sup>\*</sup>, Andrews University and **Erick Giovanni Maldonado**, Union Adventist University (1203-05-46395)
- 12:30PM *Community Preservation in Iowa: Using Clustering to Identify Communities of Interest*  
▶ (266.177) **Jayson Kunkel**<sup>\*</sup>, Grinnell College and **Eric A Autry**, Grinnell College (1203-91-46542)
- 12:30PM *Solar Energy Installation: A Cost-Benefit Analysis*  
▶ ♦ (266.178) **Kris Mae Pasia**<sup>\*</sup>, Bryn Mawr College and **Priita N Peterson**<sup>\*</sup>, Bryn Mawr College (1203-104-46393)

**(267) AMS Colloquium Lecture III - Svetlana Jitomirskaya, University of California, Berkeley**

FRIDAY, JANUARY 10 1:00PM–2:05PM **Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM *Small denominators without KAM. Robust arithmetic Spectral transitions.*  
▶ (267.1)

**Svetlana Jitomirskaya**<sup>\*</sup>, University of California, Berkeley (1203-47-36487)

**AMS Committee on the Profession Panel Discussion: AI tools for Mathematical Reasoning: What is the Current Status, Outlook for the Future, and Impact on the Mathematics Profession?**

FRIDAY, JANUARY 10 1:00PM–2:30PM **4C-2, Level Four, Seattle Convention Center Arch at 705 Pike**

This panel brings together a diverse group of panelists who will share their AI expertise on using AI tools and techniques for mathematical reasoning. The panelists will discuss their outlook for the future and influences on the mathematics profession where the discussion will then focus on curricula, collaboration across disciplines, the workforce, and other issues relevant to the mathematics profession.

- Organizers: **Christian Borgs**, University of California Berkeley  
**Henry Kvinge**, Pacific Northwest National Laboratory  
**Asamoah Nkwanta**, Morgan State University  
**Jeremy David Avigad**, Carnegie Mellon University  
**Tai-Danae Bradley**, SandboxAQ  
**Jordan S Ellenberg**, University of Wisconsin-Madison  
**Tegan Emerson**, Pacific Northwest National Laboratory  
**Yuhuai Wu**, xAI  
**Sarah Bryant**, American Mathematical Society  
**Kayla M. Roach**, American Mathematical Society

**(268) AMS Contributed Paper Session on Dynamical Systems**

FRIDAY, JANUARY 10 1:00PM–2:45PM **309, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM *An artistic introduction to multidimensional subshifts*  
▶ (268.1) **Kitty Yang**<sup>\*</sup>, UNC Asheville (1203-37-45054)
- 1:15PM *CANCELLED Polynomial effective density on the frame bundle of hyperbolic manifolds*  
♦ (268.2) **Anthony Sanchez**<sup>\*</sup>, University of California San Diego and **Ko W Ohm**, University of California San Diego (1203-37-45812)
- 1:30PM *Pisot tilings arising from zigzag interval maps*  
(268.3) **Laura Seaberg**<sup>\*</sup>, Boston College (1203-37-45329)
- 1:45PM *CANCELLED Rational maps as "mixings" of polynomials*  
(268.4) **Kathryn Anne Lindsey**<sup>\*</sup>, Boston College (1203-37-38451)

2:00PM *Lyapunov exponent for the products of random matrices related to an art collector model*  
▶ (268.5) **Audrey Benson**<sup>\*</sup>, Union College and **Phanuel A. Mariano**, Union College (1203-37-41613)

2:15PM *Causal Discovery in Nonlinear Dynamical Systems using Koopman Operators*  
▶ (268.6) **Derek Desantis**<sup>\*</sup>, Los Alamos National Laboratory, **Adam Rupe**, Pacific Northwest National Laboratory, **Craig Bakker**, Pacific Northwest National Laboratory, **Parvathi Kooloth**, Pacific Northwest National Laboratory and **Jian Lu**, Pacific Northwest National Laboratory (1203-37-38649)

2:30PM *CANCELLED Evolution models with the Allee effect*  
▶ (268.7) **E. Kwessi**<sup>\*</sup>, Trinity University (1203-37-40720)

**(269) AMS Contributed Paper Session on Groups, Topological Groups, and Lie Groups**

FRIDAY, JANUARY 10 1:00PM–2:30PM 302, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizer: **Brian D. Boe**, University of Georgia

1:00PM *Twisted Jacquet Module*  
(269.1) **Kumar Balasubramanian**<sup>\*</sup>, Indian Institute of Science Education and Research Bhopal (1203-20-37171)

1:15PM *CANCELLED The image of the total power operation in Burnside Rings*  
(269.2) **Nathan Cornelius**, University of Kentucky, **Lewis Dominguez**, University of Kentucky, **David Mehrle**<sup>\*</sup>, University of Kentucky, **Lakshay Modi**, University of Kentucky, **Millie Rose**, University of Kentucky and **Nat Stapleton**, University of Kentucky (1203-20-43001)

1:30PM *2 $\mathbb{Z}$ -Covering Numbers of Finite Groups*  
(269.3) **Joseph Kirtland**<sup>\*</sup>, Marist College and **Stephen M Gagola III**, Dod (1203-20-41611)

1:45PM *More examples of surprising circles in the boundaries of certain right-angled Coxeter groups*  
▶ ◆ (269.4) **Phuong Ha Pham**<sup>\*</sup>, Brandeis University (1203-20-44673)

2:00PM *Characterizations of Stability via Morse Limit Sets*  
(269.5) **Jacob Garcia**<sup>\*</sup>, Smith College (1203-20-44251)

2:15PM *A Kac-Weyl Character Formula*  
(269.6) **Michael Baker**<sup>\*</sup>, University of Kentucky, **Dipesh Bhandari**, Southern Methodist University and **Michael Crescimanno**, Youngstown State University (1203-22-41842)

**(270) AMS Contributed Paper Session on Teaching and Learning, and Recreational Mathematics**

FRIDAY, JANUARY 10 1:00PM–5:15PM 305, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizer: **Brian D. Boe**, University of Georgia

1:00PM *If only we could read minds! How might we develop student communication skills that reflect what they know and understand?*  
▶ (270.1) **Leann Ferguson**<sup>\*</sup>, United States Air Force Academy and **Christian Seiber**, United States Air Force Academy (1203-101-40558)

1:15PM *Post-Pandemic Deficits in Mathematics and Challenges at the Secondary Level: Analyzing Student Performance in Gateway Courses at a Southeastern HBCU*  
▶ ◆ (270.2) **Willtresca N Streeter**<sup>\*</sup>, Albany State University and **Chinenye Ofodile**, Albany State University (1203-101-44464)

1:30PM *Are Community College Students Ready to Use ChatGpt in Their Calculus and Differential Equations Classes?*  
▶ (270.3) **Igor V Baryakhtar**<sup>\*</sup>, Adjunct Professor (1203-101-45706)

1:45PM *CANCELLED - An Asynchronous Active Learning Approach for Algebra Skills within Calculus*  
▶ (270.4) **Vindya K Pathirana**<sup>\*</sup>, University of Connecticut and **Maree Jaramillo**, University of Connecticut (1203-101-45737)

2:00PM *A Perspective on Inclusive Teaching in Introductory Data Science: University, Community College, and Summer Intensive Settings*  
▶ (270.5) **Susanna Lange**<sup>\*</sup>, University of Chicago (1203-101-37632)

2:15PM *Students' Mathematical Performance and Perceptions in Inquiry-Based Mathematics and Mathematics Education Courses for Pre-service Teachers*  
▶ (270.6) **Bernadette Mullins**<sup>\*</sup>, Florida Polytechnic University and **Ann Dominick**, Birmingham-Southern College (1203-101-38232)

2:30PM *Empowering Future Teachers to Engage Hispanic Families: A Study on Culturally Sustaining Mathematics Activities in a Family Math Learning Event*  
▶ ◆ (270.7) **Dr. Mayra Lizeth Ortiz, Ph.D.**<sup>\*</sup>, University of Texas Rio Grande Valley, **Luis Miguel Fernandez**, The University of Texas Rio Grande Valley and **Olga Ramirez**, University of Texas Rio Grande Valley (1203-101-45405)

2:45PM *Mastery-Based Assessments: Reenvisioning Grades*  
▶ ◆ (270.8) **Kimberly Savinon**<sup>\*</sup>, University of Connecticut (1203-101-41975)

3:00PM *LEARNING TO INNOVATE THROUGH PLAY: IMPACT OF GAMIFICATION ON STUDENTS' LEARNING OUTCOMES IN STEM CONCEPTS*  
▶ ◆ (270.9) **Aminat Aderonke Agoro**<sup>\*</sup>, EMMANUEL ALAYANDE UNIVERSITY OF EDUCATION, OYO, NIGERIA and **Omolara Olubunmi Adeboye**, EMMANUEL ALAYANDE UNIVERSITY OF EDUCATION, OYO, NIGERIA (1203-101-37281)

3:15PM *Fostering Creativity and Enhancing Conceptual Learning in Calculus Courses Using AI-Driven Approaches and Pedagogical Techniques*  
▶ (270.10)

- Dushanthi N Herath**<sup>\*</sup>, Maryville University (1203-101-37284)
- 3:30PM  
▶ (270.11) *CANCELLED Mathematical Scene Studies: Creative connections between mathematics and dramaturgy*  
**Linda McGuire**<sup>\*</sup>, Muhlenberg College (1203-101-39007)
- 3:45PM  
▶ (270.12) *Humanizing Multivariable Calculus: Empowering students to connect mathematics to issues they care about.*  
**Victor J Donnay**<sup>\*</sup>, Bryn Mawr College (1203-101-41419)
- 4:00PM  
▶ (270.13) *Service learning projects for an elementary statistics course*  
**Paul R Bialek**<sup>\*</sup>, Oakton College (1203-101-45815)
- 4:15PM  
▶ ◆ (270.14) *Enhancing Minority-Serving STEM education through two approaches: Learning Community and Flipped Classroom*  
**Qingxia Li**<sup>\*</sup>, Fisk University (1203-101-39777)
- 4:30PM  
▶ ◆ (270.15) *CANCELLED MSRI-UP 2025: What to Expect*  
**Candice Price**, Smith College, **Robin T Wilson**<sup>\*</sup>, Loyola Marymount University and **Omayra Ortega**, Sonoma State University (1203-101-45606)
- 4:45PM  
▶ (270.16) *CANCELLED Battle of the Brains: Can Artificial Tutors Deliver Authentic Support?*  
**Cory Oliver Beyer**<sup>\*</sup>, Link-Systems International (1203-101-41596)
- 5:00PM  
▶ (270.17) *A Mathematician's Quest to Score the Game of Connections*  
**Lindsey Bosko-Dunbar**<sup>\*</sup>, St Norbert college (1203-102-44700)

**(271) AMS Contributed Paper Session on Topics in Mathematical Physics**

**FRIDAY, JANUARY 10 1:00PM-4:30PM 306, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 1:00PM  
▶ (271.1) *Classical Simulation of Non-Clifford Noise Channels in Stabilizer Formalism*  
**Peter Ye**, Yale University, **Jad Soucar**<sup>\*</sup>, University of California - Los Angeles, **Brandin Farris**, Washington State University and **Daley McMahon**, University of Pennsylvania (1203-81-42286)
- 1:15PM  
◆ (271.2) *Generalized Trotter Estimates for Quantum Simulations*  
**Sarah Chehade**<sup>\*</sup>, Oak Ridge National Laboratory (1203-81-43586)
- 1:30PM  
(271.3) *Bang-bang optimal control in coherent spin dynamics of radical pairs in quantum biology*  
**Chenming Zhen**<sup>\*</sup>, Okinawa Institute of Science and Technology, **Ugur G. Abdulla**, Analysis and PDE Unit, Okinawa Institute of Science and Technology, **Jose Rodrigues**, Okinawa Institute of Science and Technology and **Carlos Martino**, Johns Hopkins University Applied Physics Laboratory (1203-81-42789)

- 1:45PM  
(271.4) *From Feynman's time-slicing to a Rigorous Path Integral for Supersymmetric Quantum Mechanics on a Riemannian Manifold*  
**Dana S. Fine**<sup>\*</sup>, UMassDartmouth (1203-81-41619)
- 2:00PM  
(271.5) *Reflection positivity in Euclidean formulations of relativistic quantum mechanics of particles.*  
**Shaikh Gohin Samad**<sup>\*</sup>, University of Iowa and **Wayne Polyzou**, University of Iowa (1203-81-42746)
- 2:15PM  
▶ (271.6) *Combinatorial scalar QFT on graphs*  
**Ivan Contreras**, Amherst College, **Santosh Kandel**<sup>\*</sup>, California State University Sacramento, **Pavel Mnev**, Notre Dame and **Konstantin Wernli**, University of Southern Denmark (1203-81-40210)
- 2:30PM  
▶ (271.7) *Enhance the Education Quality: Advancing Bayesian's Framework in Machine Learning Modeling and Addressing Social Determinates*  
**Jing Xie**<sup>\*</sup>, Northeastern Illinois University (1203-82-44810)
- 2:45PM  
▶ (271.8) *Generalized Movement Operators for Non-Abelian Anyon Theories*  
**Noah Ringrose**<sup>\*</sup>, Pennsylvania State University, Ohio State University (1203-81-45075)
- 3:00PM  
▶ (271.9) *A Survey of Initial Data for the Einstein-Maxwell Equations Satisfying the Charged Dominant Energy Condition and a Prescribed Upper Bound for the Mean Curvature of Their Boundary*  
**Robert Jacob Abramovic**<sup>\*</sup>, UNLV (1203-83-42748)
- 3:15PM  
▶ ◆ (271.10) *Testing and Enhancement of Machine Learning Parameterizations of the Standard Deviation of Vertical Wind Velocity*  
**Lena H Liang**<sup>\*</sup>, University of Chicago, Carnegie Mellon University, **Hellen Zhao**, Columbia University, **Ilia Popov**, University of Pennsylvania and **Varun Jhaveri**, University of Massachusetts Amherst (1203-86-39224)
- 3:30PM  
(271.11) *Discrete Wavelet Transform based Parallel Hybrid Deep Learning Model for forecasting El Niño-Southern Oscillation Cycles*  
**Winston Zhou**<sup>\*</sup>, Danbury Math Academy (1203-86-45760)
- 3:45PM  
(271.12) *Levinson Formula For The Inverse Scattering Problem Of Eigenparameter Dependent Discrete Dirac Operator*  
**Turhan Koprubasi**<sup>\*</sup>, Kastamonu University, Department of Mathematics and **Ram N Mohapatra**, University of Central Florida, Department of Mathematics (1203-34-41850)
- 4:00PM  
▶ (271.13) *Spatially Correlated Sampling from Parallel Partial Emulators for Geophysical Applications*  
**Joseph Lyon**<sup>\*</sup>, Marquette University, **Elaine Spiller**, Marquette University, **Susan Minkoff**, Brookhaven National Laboratory and **Anthony Parolari**, Marquette University (1203-86-43622)

**(272) AMS Special Session on Advances in Modeling and Analysis in Life Sciences, II**

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FRIDAY, JANUARY 10 1:00PM-6:00PM Skagit 4, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Daozhou Gao**, Cleveland State University  
**Xiang-Sheng Wang**, University of Louisiana at Lafayette

- 1:00PM  
► (272.1) *Lyapunov Functions in Population Models*  
**Zhisheng Shuai**<sup>\*</sup>, University of Central Florida (1203-92-44282)
- 1:30PM  
► (272.2) *Reviewing some proofs of the reduction phenomenon*  
**Patrick De Leenheer**<sup>\*</sup>, Oregon State University, **Jordan McCaslin**, Oregon State University and **Lee Altenberg**, University of Hawaii (1203-92-42369)
- 2:00PM  
(272.3) *An Age-structured Syphilis Model*  
**Shigui Ruan**<sup>\*</sup>, University of Miami (1203-92-43933)
- 2:30PM  
(272.4) *Reaction-diffusion equations with multiple movement modes*  
**Chris Cosner**<sup>\*</sup>, University of Miami, **Robert Stephen Cantrell**, University of Miami, **Salome Martinez**, Universidad de Chile, **Xiao Yu**, South China Normal University and **Rachidi B. Salako**, University of Nevada, Las Vegas (1203-92-42385)
- 3:00PM  
(272.5) *Evolution of dispersal by memory and learning in integrodifference equation models*  
**Robert Stephen Cantrell**<sup>\*</sup>, University of Miami, **Chris Cosner**, University of Miami and **Ying Zhou**, Lafayette College (1203-92-42570)
- 3:30PM  
(272.6) *Unifying Discrete and Continuous Multiple-Strain Models with Diffusion Using Radon Measures*  
**Azmy S Ackleh**<sup>\*</sup>, University of Louisiana at Lafayette, **Nicolas Saintier**, Universidad de Buenos Aires and **Aijun Zhang**, University of Louisiana at Lafayette (1203-35-44333)
- 4:00PM  
(272.7) *Asymptotic behavior of a diffusive SIS epidemic model with mass action infection mechanism*  
**Keng Deng**<sup>\*</sup>, University of Louisiana at Lafayette (1203-92-40686)
- 4:30PM  
► (272.8) *Decision-making, epidemiological dynamics, individuals, and societies*  
**Chadi M Saad-Roy**<sup>\*</sup>, University of California, Berkeley (1203-92-43565)
- 5:00PM  
(272.9) *Implications for infectious disease models of heterogeneous mixing on control thresholds*  
**Zhilan Feng**<sup>\*</sup>, National Science Foundation and **John W Glasser**, The US Centers for Disease Control and Prevention (1203-92-41802)
- 5:30PM  
► (272.10) *Effects of Nonhomogeneous Mixing on Disease Spread*  
**Daozhou Gao**<sup>\*</sup>, Cleveland State University, **Xin Li**, Shanghai Normal University and **Xiaoyan Yuan**, Shanghai Normal University (1203-92-45445)

**(273) AMS Special Session on Advances in Nonlinear Dispersive and Kinetic Equations, II**

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FRIDAY, JANUARY 10 1:00PM-6:00PM 303, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Justin A. Holmer**, Brown University  
**Maja Taskovic**, Emory University  
**Svetlana Roudenko**, Florida International University

- 1:00PM  
► (273.1) *Explicit construction of global minimizers in Deep Learning networks*  
**Thomas Chen**<sup>\*</sup>, University of Texas at Austin and **Patricia Munoz Ewald**, University of Texas at Austin (1203-68-42762)
- 1:30PM  
(273.2) *The 3D kinetic Couette flow via the Boltzmann equation in the diffusive limit*  
**Robert M. Strain**<sup>\*</sup>, University of Pennsylvania (1203-35-44785)
- 2:00PM  
(273.3) *Invariant Gibbs measures for  $(1+1)$ -dimensional wave maps into Lie groups*  
**Bjoern Bringmann**<sup>\*</sup>, Princeton University (1203-35-40665)
- 2:30PM  
► ◆ (273.4) *Advancing stability through rigorous computation*  
**Vera Mikyoung Hur**<sup>\*</sup>, University of Illinois Urbana-Champaign, **Blake Barker**, Brigham Young University, **Jared C. Bronski**, University of Illinois Urbana-Champaign and **Olivier Henot**, Ecole Polytechnique, Centre de Mathematiques Appliquees, France (1203-35-44475)
- 3:00PM  
(273.5) *Two-solitons with logarithmic separation for 1D NLS with repulsive delta potential*  
**Stephen J Gustafson**<sup>\*</sup>, University of British Columbia (1203-35-44259)
- 3:30PM  
(273.6) *CANCELLED Some recent results on dispersion-managed nonlinear Schrödinger equations*  
**Jason Carl Murphy**<sup>\*</sup>, University of Oregon (1203-35-40710)
- 4:00PM  
(273.7) *On the nonlinear Schrödinger equation outside an obstacle*  
**Oussama Landoulsi**<sup>\*</sup>, University of Massachusetts Amherst (1203-35-45242)
- 4:30PM  
► (273.8) *5gKdV: Local Well-Posedness for Slow Decay Data*  
**Chandler Haight**<sup>\*</sup>, Florida International University (1203-35-43388)
- 5:00PM  
► ◆ (273.9) *Generalized KdV Equation: Existence of Breathers*  
**Diana Nguyen Son**<sup>\*</sup>, Florida International University (1203-35-44913)
- 5:30PM  
(273.10) *Large Time Behavior of the Vlasov-Poisson and Vlasov-Maxwell Systems*  
**Stephen D. Pankavich**<sup>\*</sup>, Colorado School of Mines (1203-35-40735)

**(274) AMS Special Session on Advances in Operator Algebras, II**

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FRIDAY, JANUARY 10 1:00PM–6:00PM 201, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Ms. Priyanga Ganesan**, University of California  
San Diego

**Changying Ding**, Vanderbilt University

**Kathryn McCormick**, California State  
University, Long Beach

1:00PM *Connes rigidity conjecture for groups with  
infinite center*

◆ (274.1)

**Adriana Fernandez I Quero\***, University of  
Iowa, **Ionut Chifan**, University of Iowa, **Hui  
Tan**, University of California, Los Angeles and  
**Denis V Osin**, Vanderbilt University (1203-46-  
39376)

1:30PM *Almost unimodular groups*

(274.2)

**Aldo Garcia Guinto\***, Michigan State University  
and **Brent Nelson**, Michigan State University  
(1203-46-41812)

2:00PM *Weak exactness and amalgamated free  
product of von Neumann algebras*

(274.3)

**Kai Toyosawa\***, Vanderbilt University (1203-  
46-41552)

2:30PM *Primeness for the von Neumann Algebra of the  
Higman-Thompson Group  $\mathcal{V}_d$*

◆ (274.4)

**Patrick DeBonis\***, Purdue University, **Rolando  
de Santiago**, Cal State University, Long Beach  
and **Krishnendu Khan**, Purdue University,  
University of Maine (1203-46-41519)

3:00PM *Finite Free Probability, recent developements*

► (274.5)

**Daniel Perales\***, Texas A&M University (1203-  
46-40377)

3:30PM *Distinguishing quantum Cuntz-Krieger and  
local quantum Cuntz-Krieger algebras*

(274.6)

**Mitch Hamidi\***, Embry-Riddle Aeronautical  
University (1203-46-41724)

4:00PM *A Complete Characterization of Passive  
Unitary Normalizable (PUN) Quantum  
Gaussian States*

► (274.7)

**Tiju Cherian John\***, The University of Arizona  
(1203-81-44143)

4:30PM *Using Diagrams to Describe Quantum  
Symmetries and Subfactors*

► (274.8)

**Melody Molander\***, UC Santa Barbara (1203-  
46-44133)

5:00PM *A theory of  $GS$ -defect sectors for symmetry-  
enriched topological orders*

► (274.9)

**Daniel Wallick\***, Ohio State University (1203-  
46-43900)

5:30PM *CANCELLED -  $C^*$ -extreme entanglement  
breaking maps on operator systems*

(274.10)

**Sriram Balasubramanian\***, Indian Institute of  
Technology (IIT), Chennai, India. and **Neha  
Hotwani**, Indian Institute of Technology (IIT),  
Chennai, India. (1203-81-36815)

**(275) AMS Special Session on Affine Algebraic  
Geometry and  $\mathbb{G}_a$ -Actions, III**

FRIDAY, JANUARY 10 1:00PM–6:00PM 607, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Gene Freudenburg**, Western Michigan  
University

**Neena Gupta**, Indian Statistical Institute

1:00PM *Geometric quotients and  $q$ -tightness of  
 $G_a$ -actions*

(275.1)

**M. Miyanishi\***, Osaka University and Kwansai  
gakuin University (1203-14-37951)

2:00PM *Cylinders over Danielewski surfaces*

(275.2)

**Lucy Moser-Jauslin\***, Université de Bourgogne  
(1203-14-42110)

3:00PM *Locally nilpotent derivations of graded integral  
domains*

(275.3)

**Daniel Daigle\***, University of Ottawa (Canada)  
(1203-13-40472)

4:00PM *Gromov's ellipticity of principal  $G_m$ -  
bundles*

(275.4)

**Shulim Kaliman\***, University of Miami (1203-  
14-38153)

5:00PM *Polynomial automorphisms of order  $p$  over  
an integral domain of characteristic  $p > 0$*

(275.5)

**Shigeru Kuroda\***, Department of Mathematical  
Sciences, Tokyo Metropolitan University (1203-  
14-41837)

**(276) AMS Special Session on Algebraic Methods in  
Machine Learning and Optimization, II**

FRIDAY, JANUARY 10 1:00PM–6:00PM Skagit 2, Lower  
Level, Seattle Convention Center  
Arch at 800 Pike

Organizers: **Prof. Guido Francisco Montufar**, University of  
California, Los Angeles

**Yulia Alexandr**, University of California, Los  
Angeles

**Julia Lindberg**, University of Wisconsin-  
Madison, USA

**Jiayi Li**, University of California, Los Angeles

1:00PM *Approximation theory for graph neural  
networks via (sparse) graph limit*

► (276.1)

**Thien Le\***, Massachusetts Institute of  
Technology (1203-68-43720)

1:30PM *Covering Number of Real Algebraic Varieties  
and Beyond: Improved Bounds and  
Applications*

► (276.2)

**Yifan Zhang\***, Oden Institute, University of  
Texas at Austin and **Joe Kileel**, University of  
Texas at Austin (1203-14-43755)

2:00PM *Some complexity results for symmetric tensor  
decomposition over  $\mathbb{C}$*

► (276.3)

**Robert Shi\***, The University of Texas at Austin  
(1203-15-43523)

2:30PM *Break*

3:00PM *Semialgebraic Methods in Convex Optimization*

(276.5)

**Kevin Shu\***, Georgia Institute of Technology,  
**Benjamin D Grimmer**, Johns Hopkins

University and **Alex Wang**, Perdue University (1203-90-37965)

3:30PM *Relative Information and the Dual Numbers*  
(276.6) **Shaowei Lin**<sup>\*</sup>, Topos Institute (1203-94-44056)

4:00PM *Discussion*

**(277) AMS Special Session on Computational Biomedicine: Emerging Methods and Applications, I**

FRIDAY, JANUARY 10 1:00PM–6:00PM Skagit 3, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Dr. Miranda L Lynch, PhD**, Hauptman-Woodward Medical Research Institute  
**Dirk Jäger**, Center for Quantitative Analysis of Molecular and Cellular Biosystems (Bioquant), Heidelberg University, Im Neuenheimer Feld 267, 69120, Heidelberg, Germany  
**Nektarios A. Valous**, Applied Tumor Immunity Clinical Cooperation Unit, National Center for Tumor Diseases (NCT), German Cancer Research Center (DKFZ), Im Neuenheimer Feld 460, 69120, Heidelberg, Germany

1:00PM *Analyzing omics and telemetry data with geometric structure*  
▶ (277.1) **Manuchehr Aminian**<sup>\*</sup>, Cal Poly Pomona, **Michael Kirby**, Colorado State University, **Helene Andrews-Polymenis**, Texas A&M University and **David Threadgill**, Texas A&M University (1203-62-43093)

1:30PM *State of the Interactomes: an evaluation of molecular networks for generating biological insights*  
▶ (277.2) **Sarah N Wright**<sup>\*</sup>, University of California, San Diego, **Scott Colton**, University of California, San Diego, **Leah V Schaffer**, University of California, San Diego, **Rudolf T Pillich**, University of California, San Diego, **Christopher Churas**, University of California, San Diego, **Dexter Pratt**, University of California, San Diego and **Trey Ideker**, University of California, San Diego (1203-92-37058)

2:00PM *Analytic inversion of an integral transform arising in Compton camera imaging*  
▶ ◆ (277.3) **Fatma Terzioglu**<sup>\*</sup>, North Carolina State University (1203-44-43437)

2:30PM *Mathematical Challenges Related to Medical Digital Twins*  
▶ (277.4) **Reinhard C. Laubenbacher**<sup>\*</sup>, University of Florida (1203-92-39696)

3:00PM *Novel Topological Metrics of Biopolymer Structure and Function*  
▶ ◆ (277.5) **Eleni Panagiotou**<sup>\*</sup>, Arizona State University (1203-57-44695)

3:30PM *A Mechanistic approach to optimizing radio-immunotherapy synergy in cancer treatment*  
▶ (277.6) **Alexander R.J. Silalahi**<sup>\*</sup>, The University of Texas MD Anderson Cancer Center, Houston,

TX 77030, USA, **Caroline Chung**, The University of Texas MD Anderson Cancer Center, Houston, TX 77030, USA, **James W. Welsh**, The University of Texas MD Anderson Cancer Center, Houston, TX 77030, USA, **Zhihui Wang**, Mathematics in Medicine Program, Houston Methodist Research Institute, Houston, TX 77030, USA and **Joseph D. Butner**, The University of Texas MD Anderson Cancer Center, Houston, TX 77030, USA (1203-92-42623)

4:00PM *A Mechanochemical Coupled Model to Understand Budding Behavior in Aging Yeast*  
▶ ◆ (277.7) **Weitao Chen**<sup>\*</sup>, University of California, Riverside (1203-92-45367)

4:30PM *Quantifying cell-state densities in single-cell phenotypic landscapes*  
(277.8) **Manu Setty**<sup>\*</sup>, Fred Hutchinson Cancer Center (1203-92-42939)

5:00PM *A Poisson-Nernst-Planck single ion channel model and its effective finite element solver*  
▶ ◆ (277.9) **Zhen Chao**<sup>\*</sup>, Western Washington University and **Dexuan Xie**, University of Wisconsin-Milwaukee (1203-65-43489)

5:30PM *Modeling tumor growth barriers, age, and remission time in a random environment*  
▶ ◆ (277.10) **Olusegun M. Otunuga**<sup>\*</sup>, Augusta University (1203-92-38201)

**(278) AMS Special Session on Current Directions on Modular Forms: in Twenty Minutes Snippets, I**

FRIDAY, JANUARY 10 1:00PM–6:00PM 606, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Olivia Beckwith**, University of Illinois Urbana-Champaign  
**Kalani Thalagoda**, Tulane University  
**Victor H Moll**, Tulane University

1:00PM *Oscillating asymptotics and conjectures of Andrews*  
(278.1) **Amanda Folsom**<sup>\*</sup>, Amherst College, **Larry Rolen**, Vanderbilt University, **Matthias Storzer**, Max Planck Institute for Mathematics--Bonn, Germany and **Joshua Males**, University of Bristol (1203-11-42793)

1:30PM *A modular framework for generalized Hurwitz class numbers*  
(278.2) **Olivia Beckwith**, Tulane University and **Andreas Mono**<sup>\*</sup>, Vanderbilt University (1203-11-36704)

2:00PM *Constructions and Applications of Mock Modularity at Depth Two*  
(278.3) **Caner Nazaroglu**<sup>\*</sup>, University of Cologne and **Kathrin Bringmann**, University of Cologne (1203-11-42546)

2:30PM *Formulas for coefficients of Ramanujan's mock theta functions*  
(278.4) **Nickolas Robert Andersen**<sup>\*</sup>, Brigham Young University and **Gradin Anderson**, Brigham Young University (1203-11-42307)

3:00PM (278.5) *Hypergeometric Moments and Hecke Trace Formulas*  
**Brian Grove**<sup>\*</sup>, Louisiana State University (1203-11-41895)

3:30PM (278.6) *Eisenstein series modulo  $Sp^2$*   
► **Scott Ahlgren**, University of Illinois at Urbana-Champaign, **Michael Hanson**, University of North Texas, **Martin Raum**, Chalmers Technical University and **Olav K. Richter**<sup>\*</sup>, University of North Texas (1203-11-41533)

4:00PM (278.7) *Congruences for modular forms modulo  $Sp^2$*   
**Michael Hanson**<sup>\*</sup>, University of North Texas (1203-11-43535)

4:30PM (278.8) *Exploring index of nilpotency in certain spaces of modular forms*  
**Ms. Swati**<sup>\*</sup>, University of South Carolina and **Matthew Boylan**, University of South Carolina (1203-11-42393)

5:00PM (278.9) *The Classification of Modular Congruence Families*  
**Nicolas Allen Smoot**<sup>\*</sup>, University of Vienna (1203-11-43315)

5:30PM (278.10) *Improvements to Sturm Bounds*  
**Peter Marcus**<sup>\*</sup>, Reed College (1203-11-42692)

**(279) AMS Special Session on Descriptive Combinatorics, Dynamics, and Measured Group Theory, II**

FRIDAY, JANUARY 10 1:00PM–6:00PM 605, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Ran Tao**, Carnegie Mellon University  
**Joshua Frisch**, University of California San Diego  
**Michael Wolman**, Caltech

1:00PM (279.1) *Detecting Stationary Measure Classes*  
► **Kunal Chawla**<sup>\*</sup>, Princeton University (1203-37-41485)

1:30PM (279.2) *Proving  $\Sigma_1^1$ -completeness results in Borel combinatorics using gadget reductions*  
**Alexander Kastner**<sup>\*</sup>, UCLA (1203-03-44313)

2:00PM (279.3) *Embedding Borel graphs into grids*  
**Anton Bernshteyn**<sup>\*</sup>, University of California, Los Angeles and **Jing Yu**, Shanghai Center for Mathematical Sciences (1203-03-42713)

3:00PM (279.4) *Hitting Sets and Borel Combinatorics*  
◆ **Cecelia Higgins**<sup>\*</sup>, University of California, Los Angeles and **Jan Grebík**, Masaryk University, University of California, Los Angeles (1203-03-42773)

3:30PM (279.5) *Separating complexity classes of LCL problems on grids*  
**Katalin Berlow**, UC Berkeley, **Anton Bernshteyn**, University of California, Los Angeles, **Clark Lyons**, Eotvos Lorand University and **Felix Weilacher**<sup>\*</sup>, UC Berkeley (1203-03-42348)

4:00PM (279.6) *Hyperfiniteness for graphs of slow intermediate growth*  
**Forte Shinko**<sup>\*</sup>, University of California, Berkeley, **Jan Grebík**, Masaryk University, **Andrew Marks**, University of California, Berkeley and **Václav Rozhoň**, INSAIT Bulgaria (1203-03-41559)

**(280) AMS Special Session on Dynamic Horizons in Mathematical Biology and Ecology: Current Insights and Future Prospects, II**

FRIDAY, JANUARY 10 1:00PM–6:00PM Skagit 5, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Prof. Gail SK Wolkowicz, PhD**, McMaster University  
**Gunog Seo**, Colgate University  
**Kunquan Lan**, Toronto Metropolitan University

1:00PM (280.1) *Initial value problems for first order ordinary differential equations with  $L^p$ -Carathéodory functions and applications*  
**Kunquan Lan**<sup>\*</sup>, Toronto Metropolitan University (1203-34-41746)

1:30PM (280.2) *Expanding optimization ensemble model methods for forecasting seasonal influenza in the U.S.*  
**Monica Gabriela Cojocar**<sup>\*</sup>, University of Guelph, **Benjamin Benteke**, University of Guelph, **Rhiannon Loster**, University of Guelph, **Van Bommel Christopher**, University of Guelph, **Pengfei Max Yu**, University of Guelph, **David Lyver**, University of Guelph and **Edward W Thommes**, Sanofi, University of Guelph (1203-92-44524)

2:00PM (280.3) *Impact of pulse vaccination on a network model*  
► **Yanyu Xiao**<sup>\*</sup>, University of Cincinnati (1203-92-41875)

2:30PM (280.4) *A unifying theoretical framework for tick-borne disease risk to explain conflicting results of enclosure experiments across scales*  
**Ari Seth Freedman**<sup>\*</sup>, Department of Ecology and Evolutionary Biology, Princeton University, **Simon A Levin**, Department of Ecology and Evolutionary Biology, Princeton University and **Giulio A De Leo**, Stanford University (1203-92-45784)

3:00PM (280.5) *Investigating the Dynamics and Stability of Dengue Disease Transmission: The Role of Vector-Pathogen Interactions and Climate Factors*  
◆ **Piyumi Chaturangika**, Department of Mathematics, University of Colombo, Sri Lanka, **Tharushika Sithumini Peiris**, Department of Mathematics, University of Colombo, Sri Lanka, **S.S.N. Perera**, Department of Mathematics, University of Colombo, Sri Lanka and **Kushani Priyangika De Silva**<sup>\*</sup>, Department of Mathematics and Statistics, University of North Carolina at Greensboro, NC, 27402 USA (1203-34-41662)

- 3:30PM  
(280.6) *A  $\Sigma$ -shaped bifurcation curve for a class of reaction diffusion equations and an application to an ecological model*  
**Keta Henderson\***, UNC Greensboro, **Ananta Acharya**, Utah State University, **J. T. Cronin**, Louisiana State University, **Gampola Waduge Nalin Fonseka**, University of Central Missouri, **Jerome Goddard**, Auburn University Montgomery, **Victor Munoz**, UNCG and **Ratnasingham Shivaji**, University of North Carolina at Greensboro (1203-35-42009)
- 4:00PM  
▶ (280.7) *Analysis of a population when a second species influences its dynamics in the interior and on the boundary*  
**Ananta Acharya\***, Eastern New Mexico University, **Shalmali Bandyopadhyay**, University of Tennessee at Martin, **J Goddard II**, Auburn University, Montgomery, **Amila Muthunayake**, Weber State University and **Ratnasingham Shivaji**, University of North Carolina Greensboro (1203-35-42516)
- 4:30PM  
(280.8) *The Hele-Shaw free boundary problem with surface tension as a sharp interface limit of the fully parabolic Keller-Segel system with nonlinear diffusion*  
**Michael Rozowski\***, University of Maryland, College Park (1203-35-44914)
- 5:00PM  
▶ (280.9) *CANCELLED Interaction of Nonlinear Diffusion and Density-dependent Dispersal on Population Persistence*  
**Keta Henderson**, Elon University, **Johannes Kaendler**, University of North Carolina at Greensboro, **Dustin Nichols\***, High Point University and **Ratnasingham Shivaji**, University of North Carolina at Greensboro (1203-34-41961)

***(281) AMS Special Session on Fractal Geometry with Applications to Analysis, Number Theory and Mathematical Physics, II***

**FRIDAY, JANUARY 10 1:00PM–5:00PM 310, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Franklin A. Mendivil**, Acadia University  
**Claire David**, Sorbonne University  
**Michel L. Lapidus**, AMS  
**Hafedh Herichi**, Organizer

- 1:00PM  
▶ (281.1) *Polyhedral Neighborhoods vs. Tubular Neighborhoods: New Insights for the Fractal Zeta Functions*  
**Claire David\***, Co-organizer and **Michel L. Lapidus**, University of California, Riverside (1203-11-42145)
- 2:00PM  
▶ (281.2) *Stochastic Heat Equation on the Sierpinski Gasket with Gaussian Noises and Their Regularity Properties*  
**Yimin Xiao\***, Michigan State University (1203-60-40370)
- 2:30PM  
(281.3) *Light Condensed Fractal Cohomology*  
**Shanna Dobson\***, University of California, Riverside (1203-11-40468)

- 3:00PM  
▶ (281.4) *Fractal structures in spectral theory of ergodic Schrodinger operators*  
**Anton Gorodetski\***, UC Irvine (1203-37-42726)
- 4:00PM  
(281.5) *Discrepancy estimates for semi-algebraic sets with applications to quantum dynamics*  
**Matthew Powell\***, Georgia Institute of Technology, **Wencai Liu**, Texas A&M University and **Xueyin Wang**, Texas A&M University (1203-81-42166)
- 4:30PM  
(281.6) *Membrane Deformation -- Finite Elements -- Parametric Shape Optimization on the Koch Snowflake*  
**Nizare Riane\***, Mohammed V University and **Claire David**, Sorbonne University (1203-28-38875)

***(282) AMS Special Session on Geometric PDE and Mathematical Physics, II***

**FRIDAY, JANUARY 10 1:00PM–6:00PM 614, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Guofang Wei**, UC Santa Barbara  
**Eric Woolgar**, University of Alberta  
**Erin Griffin**, Northwestern University  
**Eric Bahuaud**, Seattle University  
**Eric Bahuaud**, Seattle University

- 1:00PM  
(282.1) *Fundamental Gap Estimates in Various Geometries*  
**Malik Tuerkoen\***, UC Santa Barbara (1203-35-41993)
- 1:30PM  
(282.2) *A Log Sobolev inequality for non compact manifolds under non negative asymptotic  $k$ -intermediated Ricci Curvature*  
**Fabio Ricci\***, University of California, Santa Barbara and **Jihye Lee**, UC Santa Barbara (1203-53-42533)
- 2:00PM  
(282.3) *Killing fields on compact  $m$ -quasi Einstein manifolds*  
**Eric Cochran\***, Syracuse University (1203-53-41937)
- 2:30PM  
▶ ♦ (282.4) *Quasi Einstein Nilpotent and Solvable Manifolds*  
**Nazia Valiyakath\***, Syracuse University (1203-53-41893)
- 3:00PM  
(282.5) *On Isometry Invariance of the  $m$ -Quasi Einstein Equation*  
**Erin Griffin**, Northwestern University, **Ramesh Sharma**, University of New Haven, **Rahul Poddar**, Harish Chandra Research Institute, India and **William Wylie\***, Syracuse University (1203-53-43901)
- 3:30PM  
*Break*
- 4:00PM  
(282.7) *Spacetime Penrose Inequality for Cohomogeneity One Initial Data*  
**Hari Kunduri\***, Department of Mathematics and Statistics, McMaster University and **Marcus Khuri**, Stony Brook University (1203-53-42594)

- 4:30PM  
(282.8) *Positive mass theorem and positive scalar curvature for singular metrics*  
**Xianzhe Dai\***, UC Santa Barbara, **Yukai Sun**, Beijing University and **Changliang Wang**, Tongji University (1203-58-39311)
- 5:00PM  
(282.9) *Causal differential calculus in nonsmooth spacetimes*  
**Argam Ohanyan\***, University of Vienna, University of Toronto (1203-53-40546)
- 5:30PM  
(282.10) *Trading linearity for ellipticity: a nonsmooth approach to Einstein's theory of gravity and the Lorentzian splitting theorems*  
**Robert J McCann\***, University of Toronto (1203-83-43154)

**(283) AMS Special Session on History of Mathematics, I**

FRIDAY, JANUARY 10 1:00PM–6:00PM 608, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Deborah Kent**, University of St. Andrews  
**Elizabeth Hunter**, University of Chicago  
**Sloan Evans Despeaux**, Western Carolina University  
**Victor J. Katz**, University of Washington
- 1:00PM  
▶ (283.1) *Research on Primary Source Projects in the Teaching and Learning of Undergraduate Mathematics*  
**Kathleen Michelle Clark\***, The University of Alabama at Birmingham (1203-01-40731)
- 1:30PM  
▶ (283.2) *Teaching Mathematics Using Original Sources: Archimedes' "Measurement of a Circle," Part 1*  
**Martin V Bonsangue\***, California State University, Fullerton (1203-01-39719)
- 2:00PM  
▶ (283.3) *Teaching Mathematics Using Original Sources: Archimedes' "Measurement of a Circle," Part 2*  
**Jennifer Clinkenbeard\***, California State University Monterey Bay (1203-01-41125)
- 2:30PM  
▶ (283.4) *Archimedes Calculating Pi and Eating It Too*  
**Elizabeth A. Hunter\***, University of Chicago (1203-01-41637)
- 3:00PM  
▶ (283.5) *Intertextual and Intervisual Connections in Archimedes' Geometrical Works: A Comparative Study*  
**Eunsoo Lee\***, Seoul National University and **Byungchang So**, Seoul National University (1203-01-43381)
- 3:30PM *Discussion*
- 4:00PM  
▶ (283.7) *How did Fermat discover his theorem? A hands-on investigation*  
**David John Pengelley\***, Oregon State University (1203-01-38816)
- 5:00PM  
▶ (283.8) *Quantification and the Concept of 'Number' in the Premodern Islamicate World and Beyond*  
**Julia Tomasson\***, Columbia University (1203-01-44868)

- 5:30PM  
▶ (283.9) *Selected Questions from the Kokon Sanpōki (古今算法記)*  
**Alicia Zelenitsky Hill\***, Simon Fraser University (1203-01-41594)

**(284) AMS Special Session on Incorporating Programming in Non-Programming Math Courses, I**

FRIDAY, JANUARY 10 1:00PM–5:30PM 617, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Pushpi Paranamana**, Saint Mary's College  
**Mario Javier Bencomo**, University of California Fresno  
**Mario Javier Bencomo**, University of California Fresno
- 1:00PM  
▶ (284.1) *Code, Calculate, Conquer: Trials and Triumphs in Teaching Programming to Math Students*  
**Jean Marie Linhart\***, Central Washington University (1203-101-38976)
- 1:30PM  
▶ ♦ (284.2) *Data Science Approaches within Linear Algebra*  
**Mario Banuelos\***, California State University, Fresno (1203-101-44661)
- 2:00PM  
▶ ♦ (284.3) *Fostering Student Engagement by Incorporating Collaborative Programming in Math Courses*  
**Anastasiya Protasov\***, Assistant Teaching Professor (1203-101-41026)
- 2:30PM  
▶ ♦ (284.4) *Incorporating MATLAB into "non-programming" math courses*  
**Mario Javier Bencomo\***, University of California Fresno (1203-97-44342)
- 3:00PM *Break*
- 3:30PM  
▶ ♦ (284.6) *Incorporating Programming into Computational Courses - a Problem Driven Approach*  
**Josef Sifuentes\***, University of Texas Rio Grande Valley (1203-97-45003)
- 4:00PM  
▶ (284.7) *Practical Strategies for Implementing Programming Activities in Linear Algebra, Differential Equations, and Data Science Courses*  
**Kristin Kurianski\***, California State University Fullerton (1203-97-42580)
- 4:30PM  
▶ (284.8) *Using R Markdown in a Calculus-Based Statistics Course for Math Majors*  
**Kristin E Kuter\***, Saint Mary's College, Notre Dame, IN (1203-101-45142)
- 5:00PM  
▶ (284.9) *Visualizing Differential Equations in Python*  
**Gabriel Martins\***, CSU Sacramento (1203-97-43989)

**(285) AMS Special Session on Mathematic of Decisions, Elections, and Games, II**

FRIDAY, JANUARY 10 1:00PM–6:00PM Tahoma 2, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Michael A. Jones**, Mathematical Reviews | AMS  
**David McCune**, William Jewell College  
**Jennifer M. Wilson**, Eugene Lang College, New School University

- 1:00PM  
▶ (285.1) *Is there a fair voting system?*  
**Donald G. Saari**<sup>\*</sup>, Retired, Un of California Irvine (1203-91-40901)
- 1:30PM  
▶ (285.2) *Extending the Borda Count*  
**Michael E. Orrison**<sup>\*</sup>, Harvey Mudd College (1203-91-45722)
- 2:00PM  
▶ (285.3) *Axiomatic characterizations of margin-based voting methods*  
**Yifeng Ding**, Peking University, **Wesley H. Holliday**<sup>\*</sup>, University of California, Berkeley and **Eric Pacuit**, University of Maryland (1203-91-45715)
- 2:30PM  
▶ (285.4) *Two-Person Allocation of Divisible and Indivisible Goods: Envy-Free, Pareto-Optimal and/or Equitable?*  
**Steven J. Brams**, New York University, **D. Marc Kilgour**<sup>\*</sup>, Wilfrid Laurier University and **Christian Klamler**, University of Graz (1203-91-40991)
- 3:00PM  
(285.5) *Ramsey partition counts and lengths*  
**Brian Hopkins**<sup>\*</sup>, Saint Peter's University (1203-91-43207)
- 3:30PM  
▶ (285.6) *EQUAL PROPORTIONS: "As Near As May Be"*  
**Tommy Wright**<sup>\*</sup>, U.S. Bureau of the Census (1203-01-43225)
- 4:00PM  
(285.7) *Strategic Ignorance and Information Design*  
**Ina Taneva**, University of Edinburgh and **Thomas Edward Wiseman**<sup>\*</sup>, University of Texas at Austin (1203-91-43352)
- 4:30PM  
▶ (285.8) *Multidimensional Final-Offer-Arbitration with Asymmetric Issue Importance*  
**Dr. Brian Reed Powers, PhD**<sup>\*</sup>, University of Wisconsin - Madison, **Paul Pecorino**, University of Alabama and **Cary Deck**, University of Alabama (1203-91-40590)
- 5:00PM  
▶ (285.9) *Finding Condorcet*  
**Nicholas Stephanopoulos**<sup>\*</sup>, Harvard Law School (1203-91-37046)
- 5:30PM  
▶ ◆ (285.10) *How to win an election in a dynamically evolving opinion space*  
**Natasa Dragovic**<sup>\*</sup>, University of Saint Thomas, **Arkadz Kirshtein**, Texas A&M -Corpus Christi, Texas and **Christoph Borgers**, Tufts University (1203-91-41495)

**(286) AMS Special Session on Mathematical Quantum Chaos, II**

FRIDAY, JANUARY 10 1:00PM-6:00PM 612, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Semyon Dyatlov**, Massachusetts Institute of Technology  
**Maciej Zworski**, University of California, Berkeley

- 1:00PM  
(286.1) *The Spectrum of the Non-Self-Adjoint Periodic Harper's Equation*  
**Izak Oltman**<sup>\*</sup>, Northwestern University (1203-81-43429)
- 2:00PM  
(286.2) *Regularity estimates for semiclassical subelliptic equations*  
**Hart F Smith**<sup>\*</sup>, University of Washington, Seattle (1203-35-43283)
- 3:00PM  
(286.3) *The support of semiclassical measures for higher-dimensional cat maps*  
**Elena Kim**<sup>\*</sup>, Massachusetts Institute of Technology (MIT), **Theresa Anderson**, Carnegie Mellon and **Robert James Lemke Oliver**, Tufts University (1203-37-40912)
- 3:30PM  
(286.4) *Quantum-classical correspondence past Ehrenfest time*  
**Zhenhao Li**<sup>\*</sup>, Massachusetts Institute of Technology (1203-35-42954)
- 4:00PM  
(286.5) *The  $\hbar^{4/3}$  threshold in open quantum systems*  
**Felipe Hernandez**<sup>\*</sup>, Penn State University, **Daniel Ranard**, California Institute of Technology and **C. Jess Riedel**, NTT Research (1203-35-42948)
- 5:00PM  
▶ ◆ (286.6) *Time-dependent Hamiltonian Simulation: Quantum Algorithm and Superconvergence*  
**Di Fang**<sup>\*</sup>, Duke University (1203-81-41106)

**(287) AMS Special Session on Mathematics Informed by Computing, II**

FRIDAY, JANUARY 10 1:00PM-6:00PM 613, Level Six,  
Seattle Convention Center Arch at  
705 Pike

- Organizers: **Eran Assaf**, Dartmouth  
**David L. Roe**, Massachusetts Institute of Technology  
**Christelle Vincent**, University of Vermont  
**David Lowry-Duda**, ICERM & Brown University  
**David Lowry-Duda**, ICERM & Brown University
- 1:00PM  
▶ (287.1) *On counterexamples to the Mertens conjecture*  
**Seungki Kim**<sup>\*</sup>, University of Cincinnati and **Phong Nguyen**, INRIA, Ecole Normale Supérieure (1203-11-44595)
- 1:30PM  
▶ (287.2) *Using a Genetic Algorithm to Discover Extreme Examples in Arithmetic Dynamics*  
**Benjamin A. Hutz**<sup>\*</sup>, St. Louis University and **Trevor Hyde**, Vassar College (1203-37-43787)
- 2:00PM  
(287.3) *Creating Accessible Research Papers with PreTeXt*  
**Oscar Levin**<sup>\*</sup>, University of Northern Colorado (1203-103-43616)
- 2:30PM  
▶ (287.4) *Why Should I Care? Leveraging Computation to Teach Undergraduate Mathematics*  
**Emma Smith Zbarsky**<sup>\*</sup>, MathWorks (1203-101-43187)
- 3:00PM  
▶ (287.5) *The  $\pi$ -Base Model: Objects, Properties, and Theorems (oh my)*

- Steven Craig Clontz**<sup>\*</sup>, University of South Alabama (1203-68-38809)
- 3:30PM  
(287.6) *Manifolds in Lean*  
**Jim Fowler**<sup>\*</sup>, The Ohio State University and **Dennis Sweeney**, The Ohio State University (1203-57-44013)
- 4:00PM  
▶ (287.7) *CANCELLED Supporting, and maybe even saving, pure mathematics at primarily undergraduate institutions with the Lean 4 theorem prover*  
**Jon P. Bannon**<sup>\*</sup>, Siena College (1203-104-43928)
- 4:30PM  
▶ ◆ (287.8) *Synthesizing Proofs of Software Correctness with Machine Learning*  
**Alex Stanley Sanchez-Stern**<sup>\*</sup>, Unaffiliated (1203-68-44969)
- 5:00PM  
▶ ◆ (287.9) *Refining Conjectures via Automatically Generalized Proofs*  
**Anshula Gandhi**<sup>\*</sup>, University of Cambridge, **Anand Rao Tadipatri**, University of Cambridge and **William Timothy Gowers**, Collège de France, University of Cambridge (1203-68-42334)
- 5:30PM  
◆ (287.10) *A  $\backslash\emph{Macaulay2}$  Algorithm to Realize Tor Algebra Structures of Grade 3 Ideals*  
**Alexis Hardesty**<sup>\*</sup>, Texas Woman's University (1203-13-44139)

**(288) AMS Special Session on Mathematics of Topological Insulators, II**

FRIDAY, JANUARY 10 1:00PM–6:00PM Yakima 1, Level 1, Seattle Convention Center Arch at 800 Pike

- Organizers: **Xiaowen Zhu**, University of Washington  
**Alexis Drouot**, University of Washington  
**Matthew H Faust**, Texas A&M University
- 1:00PM  
(288.1) *Multiple-scales perspective on moiré materials*  
**Alexander B. Watson**<sup>\*</sup>, University of Minnesota (1203-35-41283)
- 1:30PM  
▶ (288.2) *Dirac cones and magic angles in the Bistritzer--MacDonald TBG Hamiltonian*  
**Simon Becker**, ETH Zürich, **Solomon Quinn**, University of Minnesota, **Zhongkai Tao**, University of California, Berkeley, **Alexander B. Watson**, University of Minnesota and **Mengxuan Yang**<sup>\*</sup>, University of California, Berkeley (1203-35-41173)
- 2:00PM  
(288.3)  *$SO(n)$  AKLT Chains as Symmetry Protected Topological Quantum Ground States*  
**Michael Ragone**<sup>\*</sup>, University of California, Berkeley and **Bruno Nachtergaele**, University of California, Davis (1203-81-43997)
- 2:30PM  
(288.4) *Projected Green's Function Methods Applied to Quasi-Periodic Systems and the Dry Ten Martini Problem*  
**Dan Schlomo Borgnia**<sup>\*</sup>, University of California, Berkeley (1203-47-45443)

- 3:00PM  
(288.5) *Asymmetric transport in continuous topological insulators*  
**Solomon Quinn**<sup>\*</sup>, Flatiron Institute and **Guillaume Bal**, University of Chicago, Statistics, Mathematics and CCAM (1203-35-42075)
- 3:30PM  
▶ (288.6) *Classification of disordered insulators in 1D and beyond*  
**Jui-Hui Chung**<sup>\*</sup>, Princeton University (1203-46-43414)
- 4:00PM  
(288.7) *Wave propagation in junctions of periodic half-spaces*  
**Pierre Amenoagbadji**<sup>\*</sup>, Columbia University, **Sonia Fliss**, POEMS (UMR CNRS-ENSTA Paris-IPP) and **Patrick Joly**, POEMS (UMR CNRS-ENSTA Paris-IPP) (1203-35-40527)
- 4:30PM  
(288.8) *Schroödinger Degeneracies of Lattice Potentials*  
**Curtiss Lyman**<sup>\*</sup>, University of Washington (1203-35-41953)
- 5:00PM  
▶ (288.9) *Quadratic band degeneracies and Dirac points in deformed periodic media*  
**Jonah Chaban**<sup>\*</sup>, Columbia University, **Michael I. Weinstein**, Columbia University and **Jeremy Marzuola**, University of North Carolina at Chapel Hill (1203-35-43856)

**(289) AMS Special Session on Mathematics, AI, and the Social Context of Our Work, II**

FRIDAY, JANUARY 10 1:00PM–6:00PM 618, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Darren Byler**, Simon Fraser University  
**Yaim Cooper**, University of Notre Dame
- 1:00PM  
▶ (289.1) *Mathematics for democracy: New research directions in social choice, districting, and representation*  
**Ismar Volic**<sup>\*</sup>, Wellesley College (1203-91-41100)
- 1:30PM  
▶ (289.2) *A Law Professor's Perspective on Math and Democracy*  
**Nicholas Stephanopoulos**<sup>\*</sup>, Harvard University (1203-104-45193)
- 2:00PM *Panel and Discussion*
- 2:30PM  
▶ (289.4) *Effects of Population Sorting Technologies*  
**Darren Byler**<sup>\*</sup>, Simon Fraser University (1203-104-44623)
- 3:00PM  
▶ (289.5) *Ties between math and surveillance*  
**Ila Varma**<sup>\*</sup>, University of Toronto (1203-104-45586)
- 3:30PM *Panel and Discussion*
- 4:00PM  
▶ (289.7) *Mathematical Frameworks for AI in High-consequence Environments*  
**Aaron B Luttmann**<sup>\*</sup>, Pacific Northwest National Laboratory (1203-104-45581)

4:30PM *Rethinking the relationship between the tech industry and war*  
▶ (289.8) **Cheyne Anderson\***, Independent (1203-104-45592)

5:00PM *Panel and Discussion*

### ***(290) AMS Special Session on Methods of Compassionate Math II***

FRIDAY, JANUARY 10 1:00PM–6:00PM **Chelan 5, Level 2, Seattle Convention Center Arch at 800 Pike**

Organizers: **Theodore V Theodosopoulos**, Nueva School  
**Paul Dancstep**, Topos Institute  
**Nathan Haydon**, University of Waterloo  
**Priyaa Varshinee Srinivasan**, Topos Institute

1:00PM *On how mathematics is compassionate to me, featuring nonstandard ideas in infinite matroid theory*  
▶ ◆ (290.1) **Irfan Alam\***, N/A (1203-104-45104)

1:30PM *Sheaf theory for pastry chefs*  
◆ (290.2) **Ariel Rosenfield\***, UC Irvine (1203-18-41782)

2:00PM *Discussion 3*

2:30PM *Peirce's Existential Graphs and String Diagrams for First-Order Logic*  
▶ (290.4) **Nathan Haydon\***, University of Waterloo (1203-03-42854)

3:00PM *The Flower Calculus: an interactive and diagrammatic approach to constructive proofs*  
▶ (290.5) **Pablo Donato\***, Grothendieck Institute (1203-03-41878)

3:30PM *Discussion 4*

4:00PM *Crafting Mathematical Narratives: A path to connecting components*  
▶ ◆ (290.7) **Kristine Bauer\***, University of Calgary (1203-55-45501)

4:30PM *The Art of Communicating Mathematics: Lessons from Graphic Design*  
▶ (290.8) **Tai-Danae Bradley\***, SandboxAQ (1203-101-41942)

5:00PM *Communicating relational thinking*  
▶ ◆ (290.9) **Priyaa Varshinee Srinivasan\***, Tallinn University of Technology (1203-101-43348)

5:30PM *Discussion 5*

### ***(291) AMS Special Session on Modeling and Optimization on Graph-Structured Data, II***

FRIDAY, JANUARY 10 1:00PM–3:00PM **203, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Weihong Guo**, Case Western Reserve University

**Yifei Lou**, University of North Carolina at Chapel Hill

**Jing Qin**, University of Kentucky

1:00PM *Local Nominations for Global Domination: Automated Addressing and Subnetworking in Satellite Networks*  
▶ (291.1)

**Keith Sullivan\***, The University of Vermont and **Robert S Kassouf-Short**, NASA Glenn Research Center (1203-94-43595)

1:30PM *Enrichment-Driven Recommender for Drug Repurposing in Large Biomedical Knowledge Graph*  
▶ ◆ (291.2)

**Harlin Lee\***, University of North Carolina at Chapel Hill (1203-68-39686)

2:00PM *Modeling Content Spreading On Networks Through Network Science And Graph Neural Networks*  
▶ (291.3)

**Abhinav Chand\***, Kansas State University (1203-94-45043)

2:30PM *Vertex clustering in diverse dynamic networks*  
▶ ◆ (291.4) **Devavrat Vivek Dabke\***, Level Ventures and **Olga Dorabiala**, University of Washington (1203-05-41761)

### ***(292) AMS Special Session on New Developments in Noncommutative Algebra, II***

FRIDAY, JANUARY 10 1:00PM–6:00PM **602, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Ellen E Kirkman**, Wake Forest University  
**James Jian Zhang**, University of Washington  
**Robert Won**, George Washington University

1:00PM *Growth and complexity*  
▶ (292.1) **Be"eri Greenfeld\***, University of Washington, **Carlos Gustavo Moreira**, Instituto Nacional de Matemática Pura e Aplicada, Southern University of Science and Technology and **Efim Zelmanov**, Southern University of Science and Technology (1203-16-39430)

1:30PM *Some invariants of Artin-Schelter Regular rings*  
(292.2) **Colin Ingalls\***, Carleton University (1203-16-44423)

2:00PM *Taking the Ext algebra is a process that distributes across twisted tensor product.*  
◆ (292.3) **Maureen Zhang\***, University of California, Irvine (1203-16-44040)

2:30PM *Algebras associated to inverse systems of projective schemes*  
(292.4) **Andrew B Conner\***, Saint Mary's College of California and **Peter Goetz**, Humboldt State University (1203-16-44330)

3:00PM *Four-Vertex Quivers Supporting Twisted Graded Calabi-Yau Algebras*  
▶ (292.5) **Jason Gaddis**, Miami University, **Thomas Lamkin\***, University of California San Diego, **Thy Nguyen**, Miami University and **Caleb Wright**, Miami University (1203-16-45288)

3:30PM (292.6) *Quantum-symmetric equivalence is a graded Morita invariant*  
**Hongdi Huang**, Shanghai University, **Van C. Nguyen**, U.S. Naval Academy, **Kent B. Vashaw**, University of California Los Angeles, **Padmini Veerapen**, Tennessee Tech University and **Xingting Wang**, Louisiana State University (1203-16-43983)

4:00PM (292.7) *Koszul regular algebras and 2-cocycle twists*  
**Padmini Veerapen**, Tennessee Tech University (1203-16-42553)

4:30PM (292.8) *Enveloping algebras of Lie algebras of derivations*  
**Lucas Buzaglo**, UC San Diego (1203-16-42041)

5:00PM (292.9) *Irreducible Representations of Quantum Flag Varieties at Roots of Unity*  
**Aria Masoomi**, Northeastern University (1203-16-44357)

5:30PM (292.10) *Closed subcategories of noncommutative schemes*  
**Daniel S Rogalski**, UCSD (1203-18-44984)

**(293) AMS Special Session on Recent Advances in Potential Theory and Partial Differential Equations, II**

FRIDAY, JANUARY 10 1:00PM–6:00PM 213, Level Two, Seattle Convention Center Arch at 705 Pike

Organizer: **Ugur G. Abdulla**, Department of Mathematical Sciences, Florida Institute of Technology

1:00PM (293.1) *On spatial intermittency in turbulent flows and possible formation of singularities*  
**Zoran Grujic**, The University of Alabama at Birmingham (1203-35-40587)

2:00PM (293.2) *Boundary obstacle-type problems for a class of weighted bi-Laplace operators*  
**Donatella Danielli**, Arizona State University and **Giovanni Gravina**, Loyola University Chicago (1203-35-42880)

3:00PM (293.3) *Non-simple Blowup solutions and vanishing estimates for singular Liouville equations*  
**Lei Zhang**, University of Florida (1203-35-39861)

4:00PM (293.4) *Particle representation for the heat equation with mass creation*  
**Ilie A. Grigorescu**, University of Miami (1203-35-42571)

5:00PM (293.5) *The Wiener criterion for nonlocal Dirichlet problems*  
**Minhyun Kim**, Hanyang University, **Ki-Ahm Lee**, Seoul National University and **Se-Chan Lee**, Seoul National University (1203-31-36767)

5:30PM (293.6) *Wiener's Criterion at  $\infty$  for Divergence Form Parabolic Operators with  $C^1$ -Dini Continuous Coefficients*  
**Daniel Paul Tietz**, Okinawa Institute of Science and Technology and **Ugur G. Abdulla**,

Okinawa Institute of Science and Technology (1203-31-42089)

**(294) AMS Special Session on Results on Curves and Surfaces Inspired by Experiments, II**

FRIDAY, JANUARY 10 1:00PM–4:00PM 620, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Thi Hanh VO**, University of Luxembourg  
**Khanh Le**, Temple University  
**Chris Soteros**, University of Saskatchewan  
**Puttipong Pongtanapaisan**, University of Saskatchewan

1:00PM (294.1) *Direct Sampling of Confined Polygons in Linear Time*  
**Clayton Shonkwiler**, Colorado State University and **Kandin Theis**, Colorado State University (1203-57-44262)

1:30PM (294.2) *The Tanglenomicon: tabulation of two string tangles*  
**Joseph C Starr**, University of Iowa, **Isabel K. Darcy**, University of Iowa, **Nicholas Connolly**, INRIA, **Zachary Bryhtan**, University of Iowa, **Ethan Rooke**, University of Iowa and **Paria Karimi Kousalari**, University of Iowa (1203-57-40424)

2:00PM (294.3) *Quantifying biological pattern formation: a time-dynamic persistent homology approach*  
**Daniel Tolosa**, Purdue University and **Alexandria Volkening**, Purdue University (1203-55-43707)

2:30PM (294.4) *Letter Insertion Homology for understanding DNA mutation in RNA-mediated repair.*  
**Francisco Martinez Figueroa**, University of South Florida, **Natasha Jonoska**, University of South Florida and **Masahico Saito**, University of South Florida (1203-54-45545)

3:00PM (294.5) *CANCELLED - Lattice models of DNA topology experiments*  
**Christine Soteros**, University of Saskatchewan, **Matthew Schmirler**, University of Saskatchewan and **Mariel Vazquez**, University of California, Davis (1203-82-45637)

3:30PM (294.6) *Systems of Two Spanning Self-avoiding Polygons Confined to a Lattice Tube*  
**Puttipong Pongtanapaisan**, Arizona State University, University of Saskatchewan, **Jeremy Eng**, University of Saskatchewan, Saskatchewan Polytechnic, **Robert Scharein**, Hypnagogic Software, Vancouver Canada and **Chris Soteros**, University of Saskatchewan (1203-57-45740)

**(295) AMS Special Session on Rethinking Number Theory: Highlighting the Research and Discussions of the RNT Workshops, II**

FRIDAY, JANUARY 10 1:00PM–6:00PM 604, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Sarah Arpin**, University of Colorado Boulder

**Henry Chimal-Dzul**, University of Notre Dame  
**Heidi Goodson**, Brooklyn College, City University of New York  
**Shanna Dobson**, California State University, Los Angeles

- 1:00PM (295.1) *Dynamical Irreducibility of Certain Families of Polynomials over Finite Fields*  
**Bella Tobin**<sup>\*</sup>, Agnes Scott College, **Jamie Juul**, Colorado State University, **Rebecca DeLand**, University of Colorado, **Cigole Thomas**, Colorado State University, **Bianca Thompson**, Westminster College and **Tori Day**, Mount Holyoke College (1203-11-40071)
- 1:30PM ► (295.2) *Permutation group of Reed-Solomon codes and their tensor product*  
**Welington Santos**<sup>\*</sup>, University of Wisconsin-Stout, **Hiram H. Lopez**, Virginia Tech, **Eduardo Camps**, Virginia Tech and **Jun Bo Lau**, Boston University (1203-94-44414)
- 2:00PM ◆ (295.3) *The permutation group of some Cartesian codes*  
**Hiram H. Lopez**<sup>\*</sup>, Virginia Tech (1203-94-43210)
- 2:30PM (295.4) *Locally recoverable codes with hierarchy on Artin-Schreier surfaces*  
**Jennifer Berg**<sup>\*</sup>, Bucknell University, **Beth Malmskog**, Colorado College and **Mckenzie West**, University of Wisconsin-Eau Claire (1203-14-43691)
- 3:00PM ► ◆ (295.5) *But What Is An Isogeny? A Journey through Questions, Collaborations and Quantum-Safe Cryptography*  
**Krystal Adana Maughan**<sup>\*</sup>, University of Vermont (1203-11-41696)
- 3:30PM (295.6) *Computing supersingular endomorphism rings using inseparable endomorphisms*  
**Jenny G. Fuselier**, High Point University, **Annamaria Iezzi**, Universite Grenoble Alpes, **Mark Kozek**, Whittier College, **Travis Morrison**<sup>\*</sup>, Virginia Tech and **Changningphaabi Namoijam**, Colby College (1203-11-43550)
- 4:00PM (295.7) *Towards a classification of  $\mathbb{Z}/p^2\mathbb{Z}$ -discriminant ideal twins over number fields*  
**Asimina S. Hamakiotes**<sup>\*</sup>, University of Connecticut (1203-11-42413)
- 4:30PM ► (295.8) *Local data of elliptic curves under quadratic twist*  
**Alexander J Barrios**, University of St. Thomas, **Manami Roy**<sup>\*</sup>, Lafayette College, **Nandita Sahajpal**, Nevada State University, **Darwin Tallana**, University of Colorado, **Bella Tobin**, Agnes Scott College and **Hanneke Wiersema**, University of Cambridge (1203-11-42837)
- 5:00PM ► ◆ (295.9) *RNT Panel Discussion on Research Collaborations and Mentorship*  
**Heidi Goodson**<sup>\*</sup>, Brooklyn College, City University of New York and **Sarah Arpin**, Virginia Polytechnic Institute and State University (1203-103-44635)

**(296) AMS Special Session on The Euler Water Wave Problem, II**

FRIDAY, JANUARY 10 1:00PM-6:00PM 210, Level Two, Seattle Convention Center Arch at 705 Pike

- Organizers: **Eleanor Devin Byrnes**, University of Washington  
**Bernard Deconinck**, University of Washington
- 1:00PM (296.1) *Maximum Amplitude of Steady Water Waves*  
**Walter A Strauss**<sup>\*</sup>, Brown University and **Susanna Haziot**, Princeton University (1203-76-39263)
- 1:30PM (296.2) *Stokes Waves and Their New Secondary Bifurcations*  
**Anastassiya Semenova**<sup>\*</sup>, University of Washington (1203-76-41558)
- 2:00PM (296.3) *A Hamiltonian Dysthe equation for hydroelastic waves in a compressed ice sheet.*  
**Philippe Guyenne**, University of Delaware, **Adilbek Kairzhan**<sup>\*</sup>, Nazarbayev University and **Catherine Sulem**, University of Toronto (1203-35-41080)
- 2:30PM (296.4) *Traveling surface waves for Darcy flow*  
**Huy Quang Nguyen**<sup>\*</sup>, University of Maryland, College Park (1203-35-43355)
- 3:00PM (296.5) *Uniform in gravity estimates for 2D water waves*  
**Siddhant Agrawal**<sup>\*</sup>, University of Colorado Boulder (1203-35-39275)
- 3:30PM (296.6) *Rational approximation and branch cuts for standing water waves*  
**Jon A Wilkening**<sup>\*</sup>, UC Berkeley and **Ahmad Abassi**, UC Berkeley (1203-76-42759)
- 4:00PM ► (296.7) *High Amplitude Water Waves in Finite Depth Water*  
**Eleanor Devin Byrnes**<sup>\*</sup>, University of Washington, **Bernard Deconinck**, University of Washington, **Anastassiya Semenova**, University of Washington and **Sergey A Dyachenko**, University at Buffalo (1203-76-43817)
- 4:30PM (296.8) *Obtaining Stokes waves with high-precision using conformal maps and spectral methods on non-uniform grids*  
**Denis Silantyev**<sup>\*</sup>, University of Colorado at Colorado Springs (1203-76-45527)
- 5:00PM (296.9) *Stability of Waves with Shear Currents*  
**Katie L Oliveras**<sup>\*</sup>, Seattle University (1203-76-44698)
- 5:30PM (296.10) *Least-action incompressible flows and the adhesion model*  
**Robert L Pego**<sup>\*</sup>, Carnegie Mellon University (1203-76-41466)

**(297) AMS Special Session on Topology and Geometry Aspect of Deep Learning, II**

FRIDAY, JANUARY 10 1:00PM-4:00PM Tahoma 1, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Yen-lung Tsai**, National Chengchi University  
**Tse-Yu Lin**, National Taiwan University

1:00PM  
▶ (297.1) *Improving Visual Question Answering Models through Robustness Analysis and In-context Learning with a Chain of Basic Questions*  
**Jia-Hong Huang\***, University of Amsterdam (1203-68-43591)

1:30PM  
▶ (297.2) *Representation and Comparison of Tree-like Data in Hyperbolic Space*  
**Tse-Yu Lin\***, National Taiwan University (1203-104-41583)

2:00PM  
▶ (297.3) *Expanding the Mathematical Horizons of Machine Learning: Equivariance and Symmetry*  
**Shih-Hsin Wang\***, University of Utah (1203-104-43512)

3:00PM *Discussion*

**(298) AMS Special Session on Trustworthy AI Applications Including Machine Learning, PINN, and Inverse Problems, II**

FRIDAY, JANUARY 10 1:00PM–5:00PM 205, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Taufiqar Khan**, University of North Carolina at Charlotte  
**Andrew Pangia**, University of North Carolina at Charlotte

1:00PM  
◆ (298.1) *Debiasing Watermarks for Large Language Models via Importance Sampling*  
**Yangxinyu Xie\***, University of Pennsylvania, Argonne National Laboratory, **Xiang Li**, University of Pennsylvania, **Weijie Su**, University of Pennsylvania, **Tanwi Mallick**, Argonne National Laboratory and **Ruixun Zhang**, Peking University (1203-62-43872)

1:30PM  
▶ (298.2) *Escaping the impossibility of (group) fairness in performative prediction*  
**Yuekai Sun\***, University of Michigan (1203-68-40306)

2:00PM  
▶ (298.3) *Trustworthy Anomaly Detection*  
**Depeng Xu\***, University of North Carolina at Charlotte (1203-68-43749)

2:30PM  
▶ (298.4) *Less-Discriminatory Alternative and Interpretable Binary-Class Models*  
**Andrew Pangia\***, University of North Carolina at Charlotte and **Taufiqar R Khan**, University of North Carolina at Charlotte (1203-90-41966)

3:00PM  
(298.5) *Trustworthy Interactions with Reinforcement Learning Agents*  
**Minwoo Lee\***, University of North Carolina at Charlotte and **Benjamin Poole**, University of North Carolina at Charlotte (1203-104-44280)

3:30PM  
▶ (298.6) *On marginal feature attributions of tree-based models*  
**Khashayar Filom\***, Researcher in Industry (1203-68-45661)

4:00PM  
(298.7) *Post-processing methods with distribution control for bias mitigation in machine learning models using Wasserstein-based fairness metrics*

**Alexey Miroshnikov\***, Discover Financial Services (1203-49-42512)

4:30PM  
(298.8) *Smoothing assisted deep learning with dependent data*  
**Jiancheng Jiang\***, University of North Carolina at Charlotte (1203-62-42802)

**(299) ASL Invited Address - Alexi Block Gorman, Ohio State University**

FRIDAY, JANUARY 10 1:00PM–2:00PM 2A, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizer: **David Reed Solomon**, University of Connecticut

1:00PM  
(299.1) *Characterizing  $\mathbb{Z}^k$ -automatic expansions of Presburger arithmetic*  
**Alexi Block Gorman\***, Université Gustave-Eiffel (1203-03-41913)

**(300) AWM Special Session on AWM Purdue Chapter: Over a Decade of Empowering Women in Math, II**

FRIDAY, JANUARY 10 1:00PM–5:00PM 4C-1, Level Four,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Yiran Wang**, Purdue University  
**Asini Anuradhika Konpola**, Purdue University  
**Daniel Tolosa**, Purdue University  
**Sofia Rose Martinez Alberga**, Purdue University

1:00PM  
▶ (300.1) *Introduction to Configuration Spaces and Homological Stability*  
**Sarah Anderson\***, Purdue University (1203-55-44298)

1:30PM  
◆ (300.2) *The Lefschetz Properties for Modules over Clements-Lindström Rings*  
**Bek Chase\***, Purdue University (1203-13-43888)

2:00PM  
(300.3) *Invariants and Gorensteinness of blowup algebras arising from ladder determinantal modules*  
**Kuei-Nuan Lin\***, Penn State University (1203-13-39525)

3:00PM  
▶ (300.4) *Elated Numbers*  
**Nathan Fox**, Canisius University, **Norman Fox**, AUSTIN PEAY STATE UNIVERSITY, **Helen G Grundman**, Bryn Mawr College, **Rachel Lynn\***, Schreiner University, **Changningphaabi Namoijam**, Colby College and **Mary Vanderschoot**, Wheaton College (1203-11-45169)

3:30PM  
(300.5) *The Structure of Weight and Function Classes With Coprime Bases*  
**Chiara Travesset\***, University of Wisconsin-Madison, **Theresa Anderson**, Carnegie Mellon

and **Joey Veltri**, The Pennsylvania State University (1203-28-43652)

4:00PM  
◆ (300.6) *McDuff von Neumann Algebras from Thompson-Like Groups*  
**Patrick DeBonis**<sup>\*</sup>, Purdue University, **Rolando de Santiago**, Cal State University, Long Beach and **Krishnendu Khan**, University of Maine (1203-46-41524)

4:30PM  
(300.7) *Inverse Boundary Value Problems Arising in Nonlinear Acoustic Imaging*  
**Yang Zhang**<sup>\*</sup>, University of Washington and **Li Li**, Yau Mathematical Sciences Center (1203-35-43940)

### ***AWM Workshop Panel: The Intersection of AI and Women+ in the Mathematical Sciences***

FRIDAY, JANUARY 10 1:00PM–2:30PM 4C-4, Level Four,  
Seattle Convention Center Arch at  
705 Pike

As evidenced by the fact that AI is the theme of this year's JMM, AI is making inroads into the lives of mathematicians. In this panel the discussion will focus on AI and women+. With leading industry and academic experts, we will discuss the roles women will ideally play in the development of AI and what effect AI will likely have on women - both in general and more specifically as mathematicians and educators.

Organizers: **Kelly McKinnie**, University of Montana  
**Kate Petersen**, University of Minnesota Duluth  
Panelists: **Maria Klawe**, President of Math for America  
**Talithia Williams**, Harvey Mudd College  
**Lila Ghemri**, Texas Southern University  
**Kristin E. Lauter**, Facebook

### ***(301) CRM-PIMS-AARMS Special Session on Optimal Transport - Theory and Applications, I***

FRIDAY, JANUARY 10 1:00PM–5:00PM 615, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Zaid Harchaoui**, University of Washington, Seattle  
**Bamdad Hosseini**, University of Washington  
**Jingwei Hu**, University of Washington  
**Yanqin Fan**, University of Washington, SEattle  
**Brendan Pass**, University of Alberta  
**Young-Heon Kim**, University of British Columbia  
**Soumik Pal**, University of Washington

1:00PM  
(301.1) *Optimal Transport and Particle Physics*  
**Katy Craig**<sup>\*</sup>, University of California, Santa Barbara (1203-49-40816)

1:30PM  
▶ (301.2) *Variational Optimal Transport Methods for Nonlinear Filtering*  
**Mohammad Al-Jarrah**, University of Washington, **Niyizhen Jin**, University of Washington, **Bamdad Hosseini**, University of Washington and **Amirhossein Taghvaei**, University of Washington (1203-93-41150)

2:00PM  
▶ (301.3) *Tight stability bounds for entropic Brenier maps*

**Vincent Divol**, ENSAE/CREST, **Jonathan Niles-Weed**<sup>\*</sup>, Courant Institute, New York University and **Aram-Alexandre Pooladian**, New York University (1203-49-44469)

2:30PM  
▶ (301.4) *Monge-Kantorovich Fitting Under Sobolev Budgets*

**Forest Kobayashi**<sup>\*</sup>, University of British Columbia, **Young-Heon Kim**, University of British Columbia and **Jonathan Hayase**, University of Washington (1203-49-43790)

3:00PM  
(301.5) *Iterated Schrödinger Bridge approximation to Wasserstein Gradient Flows*

**Medha Agarwal**, University of Washington, Seattle, **Zaid Harchaoui**, University of Washington, Seattle, **Garrett Mulcahy**<sup>\*</sup>, University of Washington, Seattle and **Soumik Pal**, University of Washington (1203-60-41825)

3:30PM  
(301.6) *Stability and statistical inference for semidiscrete optimal transport maps*

**Ritwik Sadhu**<sup>\*</sup>, University of Washington, **Ziv Goldfeld**, Cornell University and **Kengo Kato**, Cornell University (1203-60-44173)

4:00PM  
(301.7) *Conditional Optimal Transport: Amortized Inference for Bayesian Inverse Problems*

**Alexander Hsu**<sup>\*</sup>, University of Washington, **Bamdad Hosseini**, University of Washington and **Amirhossein Taghvaei**, University of Washington (1203-60-43711)

4:30PM  
(301.8) *Estimation of one-dimensional structures from noisy empirical observation*

**Andrew Warren**<sup>\*</sup>, University of British Columbia, **Forest Kobayashi**, University of British Columbia, **Anton Afanassiev**, University of British Columbia, **Young-Heon Kim**, University of British Columbia and **Geoff Schiebinger**, University of British Columbia (1203-49-43282)

### ***(302) ILAS Special Session on 05C50 Offline, II***

FRIDAY, JANUARY 10 1:00PM–5:00PM 204, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Stephen Kirkland**, University of Manitoba  
**Hermie Monderde**, University of Manitoba

1:00PM  
▶ (302.1) *CANCELLED - A matricial view of the Collatz conjecture*

**Pietro Paparella**<sup>\*</sup>, University of Washington Bothell (1203-05-39615)

1:30PM  
▶ (302.2) *Eigenspaces of graphs and their utility*  
**Garrett Kepler**<sup>\*</sup>, Washington State University (1203-05-45451)

2:00PM  
▶ (302.3) *On graphs and hypergraphs with  $\$r\$-friendship property$*

**Mahsa N Shirazi**<sup>\*</sup>, University of Manitoba (1203-05-45362)

2:30PM  
(302.4) *An inverse eigenvalue problem for structured matrices determined by graph pairs*

**Minerva Catral**<sup>\*</sup>, Xavier University, **Adam H Berliner**, St. Olaf College, **Michael Cavers**, University of Toronto, **Sooyeong Kim**, University of Guelph and **Pauline van den Driessche**, University of Victoria, (1203-05-44018)

3:00PM *Break*

3:30PM (302.6) *Recent results in spectral Tur\`an theory*  
**Michael Tait**<sup>\*</sup>, Villanova University (1203-05-41597)

4:00PM (302.7) *Norhaus-Gaddum Questions Relating to the Spectra of Graph Laplacians*  
**Mark Kempton**<sup>\*</sup>, Brigham Young University (1203-05-42083)

4:30PM (302.8) *Deletion-contraction for a unified Laplacian and applications*  
**Victor Wang**<sup>\*</sup>, Harvard University (1203-05-44344)

***MAA Project NEXt Panel Discussion: Thriving in Academia: Striking the Perfect Chord Between Work and Life***

FRIDAY, JANUARY 10 1:00PM-2:15PM 609, Level Six,  
Seattle Convention Center Arch at  
705 Pike

In the demanding world of academia, balancing professional responsibilities with personal well-being is crucial yet often elusive. Our session aims to address this challenge by inviting a panel of speakers in different stages of their academic careers to speak about how they have managed this balance.

Organizers: **Yesim Demiroglu**, California State University, Sacramento  
**Brandon Sweeting**, Washington University in St. Louis  
**Rachel Bailey**, Bentley University  
**Katrin Wehrheim**, University of California, Berkeley  
**Nicholas Gorgievski**, Bentley University  
**Silvia Ghinassi**, University of Washington  
**Ryan Alvarado**, Amherst College  
**William Thomas Ross**, University of Richmond

***Professional Enhancement Program (PEP) 4A: Formalization in the Lean Theorem Prover***

FRIDAY, JANUARY 10 1:00PM-3:00PM Willow A, Second  
Floor, Sheraton Grand Seattle

Organizer: **Alex Kontorovich**, Rutgers University

***(303) SIAM Minisymposium on Mathematical Foundations of Climate and Earth System Modeling***

FRIDAY, JANUARY 10 1:00PM-6:00PM 3A, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Chris Eldred**, Sandia National Laboratories

**Chris Vogl**, Lawrence Livermore National Laboratory

**Irina Tezaur**, Sandia National Laboratories

1:00PM  
▶ ◆  
(303.1)

*High-resolution Simulations to better understand Hurricane Rapid Intensification*  
**Francis Giraldo**<sup>\*</sup>, Naval Postgraduate School, **Soonpil Kang**, Naval Postgraduate School, **Kiran Jadhav**, Naval Postgraduate School, **James Kelly**, Naval Research Laboratory and **Stephen Guimond**, Hampton University (1203-86-44503)

1:30PM  
▶ (303.2)

*Finite element method errors in Stokes models of glacier evolution*  
**Ed Bueler**<sup>\*</sup>, University of Alaska Fairbanks (1203-86-38055)

2:00PM  
▶ (303.3)

*Enhanced Sea Ice Mechanics with the Material-Point Method*  
**Kara Peterson**<sup>\*</sup>, Sandia National Laboratories, **Deborah Sulsky**, University of New Mexico, **Adrian Turner**, Los Alamos National Laboratory and **Svetoslav Nikolov**, Sandia National Laboratories (1203-86-44257)

2:30PM  
(303.4)

*More accurate time integration for rain microphysics with SPAECIES*  
**Justin Dong**, Lawrence Livermore National Laboratory, **Sean Patrick Santos**<sup>\*</sup>, Pacific Northwest National Laboratory, **Steven Roberts**, Lawrence Livermore National Laboratory, **Carol Woodward**, Lawrence Livermore National Laboratory and **Chris Vogl**, Lawrence Livermore National Laboratory (1203-65-45018)

3:00PM  
▶ (303.5)

*Well-posedness of surface-atmosphere exchange formulations in global climate models*  
**Justin Dong**<sup>\*</sup>, Lawrence Livermore National Laboratory, **Michael Brunke**, University of Arizona, **Chris Vogl**, Lawrence Livermore National Laboratory, **Hui Wan**, Pacific Northwest National Laboratory, **Carol Woodward**, Lawrence Livermore National Laboratory and **Xubin Zeng**, University of Arizona (1203-86-41729)

3:30PM  
(303.6)

*Thermodynamically Consistent Modeling of Geophysical Fluids: A Variational Perspective*  
**Francois J. M. Gay-Balmaz**<sup>\*</sup>, Nanyang Technological University (NTU) (1203-76-43188)

4:00PM  
▶ (303.7)

*Enhancing Geometrical Calculations in Earth System Modeling: Algorithmic Rigor and Mathematical Foundations*  
**Hongyu Chen**<sup>\*</sup>, University of California, Davis, **Paul Ullrich**, University of California, Davis, Lawrence Livermore National Laboratory and **Julian Panetta**, University of California, Davis (1203-65-45243)

4:30PM  
(303.8)

*Spatial Uncertainty Quantification for Remote Sensing Data*  
**Amy Braverman**<sup>\*</sup>, Jet Propulsion Laboratory (Caltech) (1203-62-40100)

5:00PM  
◆ (303.9) *The Dynamic Likelihood Approach to Data Assimilation, with Applications in the Geosciences.*  
**Juan Mario Restrepo**<sup>\*</sup>, Oak Ridge National Laboratory, **Jorge M Ramirez**, Oak Ridge National Laboratory and **Johannes Krotz**, University of Tennessee, Knoxville (1203-86-43804)

5:30PM  
(303.10) *Moment based PSF Hessian approximation for uncertainty quantification in ice sheet inverse problems*  
**Nick Alger**<sup>\*</sup>, UT Austin, **Tucker Hartland**, LLNL, **Toby Isaac**, Argonne, **Noemi Petra**, UC Merced and **Omar Ghattas**, Oden Institute, The University of Texas at Austin (1203-65-44923)

### ***(304) SIAM Minisymposium on Mathematical Perspectives on Generative Modeling, II***

FRIDAY, JANUARY 10 1:00PM–3:00PM 2B, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Benjamin Zhang**, Brown University  
**Jimmie Adriaola**, Arizona State University

1:00PM  
► (304.1) *Structure-preserving generative models and their statistical guarantees*  
**Wei Zhu**<sup>\*</sup>, Georgia Institute of Technology (1203-68-40215)

1:30PM  
(304.2) *Paths and schedules in finite-time dynamic transport*  
**Aimee Maurais**<sup>\*</sup>, Massachusetts Institute of Technology and **Youssef Marzouk**, Massachusetts Institute of Technology (1203-68-44433)

2:00PM  
► (304.3) *Sampling with Stochastic Bridges*  
**Julius Berner**<sup>\*</sup>, Caltech, **Lorenz Richter**, Zuse Institute Berlin, **Denis Blessing**, Karlsruhe Institute of Technology and **Junhua Chen**, University of Cambridge (1203-65-40525)

2:30PM  
(304.4) *On Learning Physical Neural Representations of Dynamical Data*  
**Nicole Tianjiao Yang**<sup>\*</sup>, Emory University (1203-37-42865)

### ***(305) SIGMAA Special Session on Mathematics and the Arts, III***

FRIDAY, JANUARY 10 1:00PM–5:00PM 610, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Doug Norton**, Villanova University  
**Karl M Kattchee**, University of Wisconsin-La Crosse  
**Anil Venkatesh**, Adelphi University

1:00PM  
► (305.1) *A Reflection on Artist Statements: Mathematics in Creating Art*  
**Mara Alagic**<sup>\*</sup>, Professor @ Wichita State University (1203-104-45407)

1:30PM  
► (305.2) *Margaret Kepner's circular visualization of integer partitions*  
**Brian Hopkins**<sup>\*</sup>, Saint Peter's University (1203-05-41706)

2:00PM  
► (305.3) *The Fifth Bell Number: Three Different Views*  
**Margaret Kepner**<sup>\*</sup>, Independent Artist (1203-104-41816)

2:30PM  
► (305.4) *Denman Ross and Design Theory*  
**Jennifer M. Wilson**<sup>\*</sup>, Eugene Lang College, The New School (1203-01-39505)

3:00PM  
► (305.5) *On the Construction of max bill's  $\{it\}$  konstruktion auf der formel  $\sqrt{\}$   $a^2+b^2=c^2$*   
**Barry Cipra**<sup>\*</sup>, Freelance (1203-104-44488)

3:30PM  
► (305.6) *The Hypercube Pop-Up Book*  
**Richard H Hammack**<sup>\*</sup>, Virginia Commonwealth University (1203-51-43858)

4:00PM  
► ◆ (305.7) *Modular Circle Sculptures*  
**Susan Happersett**<sup>\*</sup>, Artist (1203-51-40905)

4:30PM  
► (305.8) *Flipping Digits and Folding Fractions (with Origami)*  
**Jonathan D. Dunbar**<sup>\*</sup>, St. Norbert College (1203-102-42731)

### ***(306) SLMath (MSRI) Special Session on ADJOINT Mathematics Working Groups, II***

FRIDAY, JANUARY 10 1:00PM–3:30PM 611, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Edray Herber Goins**, Pomona College  
**Anisah Nabilah Nu'Man**, Spelman College  
**Hélène Barcelo**, MSRI

1:00PM  
► ◆ (306.1) *Religious Affiliations and COVID-19 Vaccine Hesitancy Among US Adults: Insights from the NYU Immunization Study*  
**Kayla D Davie**<sup>\*</sup>, New York City College of Technology (1203-62-45353)

1:30PM  
► (306.2) *Combinatorics and Adinkras*  
**Rishi Nath**<sup>\*</sup>, York College, City University of New York (1203-05-44535)

2:00PM  
► (306.3) *A visual approach to symmetric chain decompositions of finite Young lattices*  
**Robert William Donley**<sup>\*</sup>, Queensborough Community College (CUNY) (1203-05-43180)

2:30PM  
► ◆ (306.4) *On a nonlocal integral operator commuting with the Laplacian and the Sturm-Liouville problem: Low rank perturbations of the operator*  
**Lotfi Hermi**<sup>\*</sup>, Florida International University (1203-45-45355)

3:00PM  
► ◆ (306.5) *Modeling Stationary and Non-Stationary Transition Probabilities in Decision Making: A Chain-Binomial Approach*  
**Isabella Kemajou-Brown**<sup>\*</sup>, Morgan State University, **Romario Gildas Foko Tiomela**, Morgan State University, **Serges Love Teutu**

Talla, Morgan State University, **Samson Adekola Alagbe**, Morgan State University and **Olawale Nasiru Lawal**, Morgan State University (1203-90-44642)

**(307) Spectra Special Session on Research by LGBTQ+ Mathematicians, II: QCAM, ESJ**

FRIDAY, JANUARY 10 1:00PM–5:00PM 400, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Michael A. Hill**, UCLA  
**Devavrat Dabke**, Level Ventures

1:00PM *Eigenvalues, eigenvectors and quantum walks*  
▶ ◆  
(307.1) **Hermie Monterde**<sup>\*</sup>, University of Manitoba (1203-05-36541)

1:15PM *CANCELLED Investigating Pursuit-Evasion Differential Games: Developing Optimal Strategies for Pursuers under Various Constraints*  
▶ ◆  
(307.2) **Mehdi Salimi**<sup>\*</sup>, Mathematics Department, Kwantlen Polytechnic University, BC, Canada (1203-91-42397)

1:30PM *A Family of Arbitrary-Order Numerical Methods for Solving the Kinetic Collection Equation and Variants Thereof*  
▶ (307.3) **Sean Patrick Santos**<sup>\*</sup>, Pacific Northwest National Laboratory (1203-65-45148)

1:45PM *Mathematical modeling of two-dimensional nonlinear gradient elution chromatography: Incorporating radial concentration dynamics*  
▶ ◆  
(307.4) **Muhammad Abid**<sup>\*</sup>, North Carolina State University (1203-65-45394)

2:00PM *High Order Entropy Stable Methods for Blood Flow Simulations*  
▶ ◆  
(307.5) **Raven Shane Johnson**<sup>\*</sup>, Rice University and **Jesse Chan**, Rice University (1203-76-40589)

2:15PM *Assessing Machine Learning and Manual Classifiers to Understand Stress During Cardiopulmonary Bypass Surgery*  
(307.6) **Tricity Andrew**<sup>\*</sup>, Seattle Children's Hospital (1203-92-45920)

2:30PM *The mathematics and biology of viral recrudescence following antiviral treatments without developing resistance*  
▶ ◆  
(307.7) **Tin Phan**<sup>\*</sup>, Theoretical Biology and Biophysics, Los Alamos National Laboratory, **Ruy M Ribeiro**, Theoretical Biology and Biophysics, Los Alamos National Laboratory, **Gregory E Edelstein**, Brigham and Women's Hospital, Harvard Medical School, **Manish C Choudhary**, Brigham and Women's Hospital, Harvard Medical School, **Julie Boucau**, Ragon Institute of MGH, MIT and Harvard, **Jeffrey A Sparks**, Brigham and Women's Hospital, Harvard Medical School, **Jacob E Lemieux**, Broad Institute of MIT and Harvard, **Amy K Barczak**, Ragon Institute of MGH, MIT and Harvard, **Mark Siedner**, Massachusetts General Hospital, Harvard Medical School, **Jonathan Z Li**, Brigham and Women's Hospital, Harvard Medical School and **Alan S Perelson**,

Theoretical Biology and Biophysics, Los Alamos National Laboratory, Santa Fe Institute (1203-92-43095)

2:45PM *Break*

3:00PM *Agent-Based Analysis of Healthcare Avoidance and Health Disparities in the U.S. Transgender and Gender Diverse Population*  
▶ ◆  
(307.9) **Chloe Rae June George**<sup>\*</sup>, University of Minnesota, Duluth (1203-37-43375)

3:15PM *A Data-Driven Analysis of the Surge in Anti-Transgender Bills in U.S. State Legislatures, 2018-2023*  
▶ ◆  
(307.10)

**Kenan Ince**, Westminster College, **Robert Bonfiglio**, Rochester Institute of Technology, **Jason Cory Brunson**, University of Florida and **Yangxinyu Xie**<sup>\*</sup>, University of Pennsylvania, Argonne National Laboratory (1203-104-44477)

3:30PM *How norms shape the evolution of prosocial behavior*  
▶ (307.11) **Brian Mintz**<sup>\*</sup>, Dartmouth College and **Feng Fu**, Dartmouth College (1203-91-42007)

3:45PM *How to be an Expert in Mathematics: Building Expertise and Intuition in Undergraduate Proofs-Based Courses*  
▶ ◆  
(307.12) **Catrina A. May**<sup>\*</sup>, University of North Georgia (1203-97-42183)

4:00PM *Groups en Action*  
▶ (307.13) **Brian P Katz**<sup>\*</sup>, California State University, Long Beach and **Jessica Lajos**, Utah State University (1203-97-42607)

4:15PM *Lessons learned from embedding learning skills content into the mathematics curriculum*  
▶ (307.14) **Andrew Skelton**<sup>\*</sup>, York University (1203-101-44559)

4:30PM *Antidotes to Math Supremacy Culture*  
▶ ◆  
(307.15) **Katrin Wehrheim**<sup>\*</sup>, free radical (1203-97-44830)

**(308) AMS Contributed Paper Session on Combinatorics, Graph Theory, Order, and General Algebraic Systems, IV**

FRIDAY, JANUARY 10 1:15PM–4:30PM 307, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

1:15PM *On symmetric pattern avoidance sets*  
▶ (308.1) **Tuong Le**<sup>\*</sup>, University of Michigan Ann Arbor (1203-05-42667)

1:30PM *Jack Combinatorics of the Equivariant Edge Measure*  
◆ (308.2) **Kyla Pohl**<sup>\*</sup>, University of Oregon and **Benjamin J Young**, University of Oregon (1203-05-44877)

1:45PM *Newton Polytopes of Dual Schubert Polynomials*  
▶ (308.3) **Serena An**, Massachusetts Institute of Technology, **Katherine Tung**, Harvard

- University and **Yuchong Zhang**<sup>\*</sup>, University of Michigan (1203-05-45237)
- 2:00PM  
▶ (308.4) *Homology in Combinatorial Refraction Billiards*  
**Colin Defant**, Harvard University and **Derek X Liu**<sup>\*</sup>, MIT (1203-05-42684)
- 2:15PM  
▶ (308.5) *Toggleability Spaces of Fences*  
**Alec Mertin**<sup>\*</sup>, Clemson University and **Svetlana Poznanović**, Clemson University (1203-05-43182)
- 2:30PM  
▶ (308.6) *Shi-like and Catalan-like deformations of restricted reflection arrangements, and parking spaces.*  
**Theodosios Douvropoulos**<sup>\*</sup>, Brandeis University (1203-05-44854)
- 2:45PM  
(308.7) *Parameter constraints for distance-regular graphs that afford spin models*  
**John Caughman**<sup>\*</sup>, Portland State University and **Taiyo S Terada**, Portland State University (1203-05-45176)
- 3:00PM  
▶ ◆ (308.8) *A study of  $v$ -number for some monomial ideals*  
**Prativa Biswas**<sup>\*</sup>, Indian Institute of Technology Kharagpur and **Mousumi Mandal**, Indian Institute of Technology Kharagpur (1203-05-41651)
- 3:15PM  
▶ (308.9) *Multitriangulations of the Half-cylinder*  
**Saskia Solotko**<sup>\*</sup>, Tufts University, **Katherine Tung**, Harvard University, **Mengyuan Yang**, Swarthmore College and **Yuchong Zhang**, University of Michigan (1203-05-45599)
- 3:30PM  
(308.10) *Posets that are CC-shellable but not CL-shellable. (Preliminary report)*  
**Stephen Lacina**<sup>\*</sup>, Truman State University and **Grace Stadnyk**, Furman University (1203-06-44507)
- 3:45PM  
(308.11) *The lattice of closure operators on a finite lattice*  
**Arturo Magidin**<sup>\*</sup>, University of Louisiana at Lafayette (1203-06-43679)
- 4:00PM  
▶ (308.12) *Vector Representation of Decreasing Codes*  
**Sam Hunter Harkness**<sup>\*</sup>, Virginia Tech, **Eduardo Camps**, Virginia Tech, **Hiram H. Lopez**, Virginia Tech, **Gretchen Matthews**, Virginia Tech and **Grant Mullins**, Virginia Tech (1203-08-44714)
- 4:15PM  
▶ (308.13) *Recognizing Algebraic Properties from Multiplication Tables*  
**Sujoy Mukherjee**, University of Denver, **Daniel Scofield**<sup>\*</sup>, Francis Marion University and **Petr Vojtechovsky**, University of Denver (1203-08-45306)

**(309) AMS Contributed Paper Session on Partial Differential Equations, II**

FRIDAY, JANUARY 10 1:15PM-3:15PM 308, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

- 1:15PM  
▶ (309.1) *Evaporation-driven tear film thinning and breakup in two space dimensions*  
**Qinying Chen**<sup>\*</sup>, University of Delaware (1203-35-43744)
- 1:30PM  
(309.2) *Liouville comparison theory for breakdown of Euler-Arnold equations*  
**Justin Valletta**<sup>\*</sup>, Florida State University (1203-35-44214)
- 1:45PM  
(309.3) *Data based attributes of Rayleigh-Taylor interfacial mixing in fluctuations spectra in experiments*  
**Kurt Williams**<sup>\*</sup>, University of Western Australia and **Snezhana I. Abarzhi**, California Institute of Technology (1203-35-45251)
- 2:00PM  
▶ ◆ (309.4) *Mach Reflection of Line Solitons in the Two-dimensional Benjamin-Ono Equation*  
**Wuyan Wang**<sup>\*</sup>, University of Colorado at Boulder and **Mark A Hoefer**, University of Colorado Boulder (1203-35-43675)
- 2:15PM  
▶ (309.5) *Investigations of Korteweg-de Vries Type Equation Breather Solutions*  
**Chandler Haight**<sup>\*</sup>, Florida International University (1203-35-43407)
- 2:30PM  
▶ (309.6) *Dry bed dambreak of a confined Bose-Einstein condensate*  
**Shashwat Sharan**<sup>\*</sup>, University of California Merced, **Patrick Sprenger**, University of California Merced, **Boaz Ilan**, University of California Merced and **Mark A Hoefer**, University of Colorado Boulder (1203-35-44886)
- 2:45PM  
▶ (309.7) *Dynamics of Ion-Acoustic Waves in a Two-Fluid Plasma*  
**Emily Kelting**<sup>\*</sup>, University of New England (1203-35-43757)
- 3:00PM  
▶ (309.8) *New Singularities Exhibited by Vector Fields Defined on Linear Combinations of Functions Generated by the Poisson Image Equation*  
**Kiana Nichole Jones**<sup>\*</sup>, California State University - Fullerton, **Alexander C Poltzer**, Florida Polytechnic University, **Dane Sheridan**, University of California, Los Angeles and **Nikolay Metodiev Sirakov**, Texas A&M University-Commerce (1203-35-43077)

**(310) AMS Special Session on Extremal Combinatorics and Random Discrete Structures, II**

FRIDAY, JANUARY 10 1:30PM-5:30PM Tahoma 3, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Corrine Yap**, Rutgers University  
**Sam Spiro**, Rutgers University

- 1:30PM  
▶ ◆ (310.1) *Tilings in randomly perturbed dense multipartite graphs*  
**Enrique Gomez-Leos**<sup>\*</sup>, Iowa State University (1203-05-43454)
- 2:00PM  
▶ (310.2) *On Rainbow Thresholds*  
**Jie Han**, Beijing Institute of Technology and **Xiaofan Yuan**<sup>\*</sup>, Arizona State University (1203-05-41576)

2:30PM *First passage percolation and random geometric graphs.*  
▶ (310.3) **Karoline Dubin**<sup>\*</sup>, University of Illinois Chicago (1203-60-44410)

3:00PM *Small genus embeddings of cubic graphs*  
▶ (310.4) **Mackenzie Carr**<sup>\*</sup>, Simon Fraser University and **Bojan Mohar**, Simon Fraser University (1203-05-42998)

3:30PM *Break*

4:00PM *Flip Dynamics for Sampling Colorings: Improving  $(11/6 - \epsilon)$  Using A Simple Metric*  
▶ ◆ (310.6) **Charlie Anne Carlson**<sup>\*</sup>, University of California Santa Barbara and **Eric Vigoda**, University of California Santa Barbara (1203-68-43359)

4:30PM *Sums of algebraic dilates*  
▶ (310.7) **Jeck Lim**<sup>\*</sup>, California Institute of Technology and **David Conlon**, California Institute of Technology (1203-11-40398)

5:00PM *Rearranging small-ish sets for distinct partial sums*  
▶ (310.8) **Benjamin Bedert**, University of Oxford and **Noah Kravitz**<sup>\*</sup>, Princeton University (1203-05-39722)

**(311) AMS Special Session on Research Presentations by Math Alliance Scholar Doctorates, II**

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FRIDAY, JANUARY 10 1:30PM–5:00PM **Skagit 1, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **David Goldberg, PhD**, Purdue University  
**Theresa Martines**, University of Texas, Austin

1:30PM *The Covariant Stone-von Neumann Theorem for Locally Compact Quantum Groups*  
◆ (311.1) **Lucas Hall**<sup>\*</sup>, Michigan State University, University of Haifa (1203-47-44452)

2:00PM *The Quaquaversal Tiling and the spectrum of its operator*  
▶ ◆ (311.2) **Josiah Sugarman**<sup>\*</sup>, CUNY (1203-52-39385)

2:30PM *An Exposition on Points on Curves*  
▶ ◆ (311.3) **Jasmine Camero**<sup>\*</sup>, Emory University (1203-14-40554)

3:00PM *The Clebsch-Gordon Problem for Truncated Polynomial Rings in One Variable*  
▶ ◆ (311.4) **Kevin Steine Harris**<sup>\*</sup>, Tacoma Community College (1203-13-42328)

3:30PM *A Circle Method Approach to  $K$ -Multimagic Squares*  
◆ (311.5) **Daniel Benjamin Flores**<sup>\*</sup>, Purdue University (1203-11-42147)

4:00PM *Rational Points on a Family of Genus 3 Curves*  
▶ ◆ (311.6) **Roberto Hernandez**<sup>\*</sup>, Emory University (1203-11-44589)

4:30PM *Success, Struggle, Surprise, and Short-term Goals: Reflections from Mathematics Graduate Students Teaching*  
▶ ◆ (311.7) **Johan Benedict Arroyo Cristobal**<sup>\*</sup>, University of Nebraska-Lincoln (1203-97-40902)

**(312) AMS Special Session on SoTL: Connecting Generative AI and Scholarly Inquiry to Improve Teaching and Learning, II**

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FRIDAY, JANUARY 10 1:30PM–5:00PM **Chelan 4, Level 2, Seattle Convention Center Arch at 800 Pike**

Organizers: **Lewis D. Ludwig**, Denison University  
**Curtis D. Bennett**, California State University, Long Beach  
**Jacqueline M Dewar**, Loyola Marymount University

1:30PM *Ethical Concerns of Mathematics Faculty and Students About Generative AI: Toward a SoTL Project*  
▶ (312.1) **Dr. Gizem Karaali**<sup>\*</sup>, Pomona College (1203-101-44443)

2:30PM *Reading and Publishing in PRIMUS*  
(312.2) **Matthew R Boelkins**<sup>\*</sup>, Grand Valley State University (1203-101-43962)

3:00PM *Doing SoTL with AI: A real-time experiment*  
▶ (312.3) **Curtis D. Bennett**<sup>\*</sup>, California State University, Long Beach, **Jacqueline M Dewar**, Loyola Marymount University and **Lewis D. Ludwig**, Denison University (1203-101-41985)

4:00PM *Achieving SoTL's potential for impact on mathematics teaching and learning*  
▶ ◆ (312.4) **Jacqueline M Dewar**<sup>\*</sup>, Loyola Marymount University, **Megan Breit-Goodwin**, Anoka-Ramsey Community College, **Ron Buckmire**, Occidental College and **Curtis D. Bennett**, California State University, Long Beach (1203-101-40726)

4:30PM *Discussion: The Future of SoTL in Mathematics*

**(313) NSF Special Session on Outcomes and Innovations from NSF Undergraduate Education Programs in the Mathematical Sciences, II**

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FRIDAY, JANUARY 10 1:30PM–5:00PM **603, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizer: **Michael Ferrara**, Division of Undergraduate Education, National Science Foundation

1:30PM *CANCELLED Early Insights into the Mathematical Dispositions of Pre-Service Elementary Educators*  
▶ (313.1) **Caterina B Azzarello**<sup>\*</sup>, University of Northern Colorado (1203-97-38854)

2:00PM *Building Confidence through Inquiry, Research, Community Leadership, and Engagement*  
▶ (313.2) **Laurie James**<sup>\*</sup>, UH-West Oahu (1203-97-38497)

2:30PM *Does the learning of mathematics change as students get older?*  
▶ ◆  
(313.3) **Michael Smalenberger\***, University of Chicago (1203-101-45129)

3:00PM *Lessons Learned from 5 years of a Large Virtual Conference*  
▶ (313.4) **Drew Lewis\***, Center for Grading Reform (1203-103-45267)

3:30PM *Eliminating Mathematics Barriers to Student Success: Teaching-Focused Faculty as Change Agents*  
▶ (313.5) **David T Kung\***, Founder, Dave Kung Consulting, Director of Programs, TPSE-Math, University of Maryland - College Park, **Gavin LaRose\***, University of Michigan and **Debra S Carney\***, Colorado School of Mines (1203-97-45636)

4:00PM *Research, Policy, and Practice Recommendations for Improving Undergraduate Mathematics Teaching and Learning*  
▶ (313.6) **Catherine Paolucci\***, WestEd (1203-97-45358)

4:30PM *Discussion*

### **(314) AMS Current Events Bulletin**

**FRIDAY, JANUARY 10 2:00PM–6:00PM Ballroom 6C, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizer: **David Eisenbud\***, University of California, Berkeley

2:00PM *Apollonian packings: the rise and fall of the local to global conjecture*  
▶ ◆  
(314.1) **Elena Fuchs\***, UC Davis (1203-11-41670)

3:00PM *Floer cohomology and invariants of singularities*  
(314.2) **Daniel Pomerleano\***, University of Massachusetts, Boston (1203-53-41523)

4:00PM *Finding Arithmetic Progressions in Dense Sets of Integers*  
▶ (314.3) **Sarah Peluse\***, Stanford University (1203-11-45826)

5:00PM *Embracing AI and Formalization: Experimenting with Tomorrow's Mathematical Tools*  
▶ (314.4) **Jarod Alper\***, University of Washington (1203-103-41640)

### **(315) AMS Special Session on Coloring Problems in Combinatorics, II**

**FRIDAY, JANUARY 10 2:00PM–6:00PM Tahoma 4, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Daniel P Johnston\***, Trinity College  
**Jeremy Quail\***, University of Vermont  
**Puck Rombach\***, University of Vermont  
**Neal Bushaw\***, Virginia Commonwealth University

2:00PM *Extremal numbers of colorings, independent sets, and Widom-Rowlinson colorings in  $k$ -chromatic graphs*  
(315.1) **John A. Engbers\***, Marquette University (1203-05-42309)

2:30PM *B-colorings of planar and outerplanar graphs*  
▶ (315.2) **Ryan R. Martin\***, Iowa State University, **Miklós Ruszinkó\***, HUN-REN Alfréd Rényi Institute of Mathematics, Sorbonne University Abu Dhabi, Pázmány Péter Catholic University and **Gábor Sárközy\***, HUN-REN Alfréd Rényi Institute of Mathematics, Worcester Polytechnic Institute (1203-05-42760)

3:00PM *Minimizing Monochromatic Subgraphs of  $K_{n,n}$*   
▶ (315.3) **Charles Lee Gong\***, Carnegie Mellon University (1203-05-39711)

3:30PM *Distinguishing Chromatic Number of Hamiltonian Circulant Graphs*  
▶ ◆  
(315.4) **Jean A Guillaume\***, Norfolk State University (1203-05-41578)

4:00PM *Chromatic and achromatic numbers of unitary addition Cayley graphs*  
▶ ◆  
(315.5) **Keenan Calhoun\***, California State University, Sacramento, **Yesim Demiroglu\***, California State University, Sacramento, **Vincent Pigno\***, California State University, Sacramento and **Craig Timmons\***, California State University, Sacramento (1203-05-36666)

4:30PM *Monomial invariants applied to graph coloring*  
▶ (315.6) **Guillermo Carlos Alesandroni\***, California State University, Chico (1203-05-39564)

5:00PM *Systole bounds for graphs of small Betti number*  
(315.7) **Chelsea Sato\***, Syracuse University (1203-05-45110)

5:30PM *Partition Regularity in Commutative Rings*  
▶ ◆  
(315.8) **Gauree Wathodkar\***, University of Mississippi (1203-05-45194)

### **(316) AMS Special Session on Inverse Problems and Harmonic Analysis, II**

**FRIDAY, JANUARY 10 2:00PM–5:00PM 304, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Kasso A. Okoudjou\***, Tufts University  
**Eric Todd Quinto\***, Department of Mathematics/Tufts University

2:00PM *Solving the inverse problem in the ocean: matched-field inversion and linearization*  
▶ (316.1) **Zoi-Heleni Michalopoulou\***, Department of Mathematical Sciences, New Jersey Institute of Technology (1203-86-38869)

3:00PM *Worst-Case Learning under Multifidelity Models*  
(316.2) **Simon Foucart\***, Texas A&M University (1203-90-41631)

3:30PM *Microlocal analysis of non-linear operators and applications in Compton CT*  
(316.3)

**James W. Webber**<sup>\*</sup>, Department of Oncology and Gynecology, Brigham and Women's Hospital, 221 Longwood Ave., Boston, MA 02115 (1203-45-41772)

4:00PM (316.4) *A gradient-free optimal control reconstruction framework in quantitative photoacoustic tomography*

**Anwesa Dey**, University of Utah, **Alfio Borzi**, University of Wuerzburg, Germany and **Souvik Roy**<sup>\*</sup>, The University of Texas at Arlington (1203-35-39770)

4:30PM (316.5) *Computing Proximity Operators for Scale and Signed Permutation Invariant Functions*  
**Jianqing Jia**<sup>\*</sup>, Syracuse University, **Ashley Prater-Bennette**, Air Force Research Laboratory and **Lixin Shen**, Syracuse University (1203-90-42365)

**(317) AMS Special Session on Sparse Graphs: Colorings, Randomness, and Ramsey Theory, II**

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FRIDAY, JANUARY 10 2:00PM-5:00PM Tahoma 5, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Abhishek Dhawan**, Georgia Institute of Technology

**James Anderson**, Georgia Institute of Technology

2:00PM (317.1) *Ramsey-Turán problems with small independence numbers*  
**Grace McCourt**<sup>\*</sup>, Iowa State University, **József Balogh**, University of Illinois Urbana-Champaign, **Ce Chen**, University of Illinois Urbana-Champaign and **Cassie Murley**, University of Illinois Urbana-Champaign (1203-05-41921)

2:30PM (317.2) *Generalized Ramsey-Turán Numbers*  
**Van Magnan**<sup>\*</sup>, University of Vermont (1203-05-43617)

3:00PM (317.3) *Topological Turan Numbers for 2-Dimensional Simplicial Complexes*  
**Maya Sankar**<sup>\*</sup>, Stanford University (1203-05-41539)

3:30PM *Coffee Break*

4:00PM (317.5) *The clique chromatic number of sparse random graphs*  
**Manuel Fernandez**<sup>\*</sup>, School of Mathematics, Georgia Tech and **Lutz Warnke**, University of California, San Diego (1203-60-42683)

4:30PM (317.6) *The "Second" Kahn-Kalai Conjecture up to Log Factors*  
**Quentin Dubroff**<sup>\*</sup>, Rutgers University, **Jeff Kahn**, Rutgers University and **Jinyoung Park**, Courant Institute of Mathematical Sciences, NYU (1203-05-43444)

**(318) AMS-MAA-SIGMAA Special Session on Exemplar Mathematics Departments Supporting PK-12 Mathematics Teachers, II**

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FRIDAY, JANUARY 10 2:00PM-5:00PM Chelan 2, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Yvonne Lai**, University of Nebraska Lincoln  
**Lindsey Henderson**, University of Utah  
**Rebecca Hartzler**, Gates Foundation  
**Karen Saxe**, American Mathematical Society  
**Tyler Kloefkorn**, American Mathematical Society

2:00PM (318.1) *What is the Cost of (Math) Wars?*  
**Erin E. Baldinger**, University of Minnesota, **Yvonne Lai**<sup>\*</sup>, University of Nebraska-Lincoln and **Charles E. Wilkes II**, University of California, Davis (1203-97-45460)

2:30PM (318.2) *Let's Rumble: De/Re-Constructing the "Content" of Mathematics Teacher Preparation*  
**Cassandra Herring**<sup>\*</sup>, BranchED (1203-97-46145)

3:00PM (318.3) *Unlearning to Teach Mathematics*  
**Deborah Loewenberg Ball**<sup>\*</sup>, University of Michigan (1203-97-45226)

4:00PM *Discussion*

**(319) ASL Invited Address - Andy Zucker, University of Waterloo**

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FRIDAY, JANUARY 10 2:00PM-3:00PM 2A, Level Two, Seattle Convention Center Arch at 705 Pike

Organizer: **David Reed Solomon**, University of Connecticut

2:00PM (319.1) *Topological dynamics and continuous logic*  
**Andy Zucker**<sup>\*</sup>, University of Waterloo (1203-37-43333)

**(320) AMS Invited Address - Kirsten Wickelgren, Duke University**

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FRIDAY, JANUARY 10 2:10PM-3:15PM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

2:10PM (320.1) *Arithmetic aspects of enumerative geometry*  
**Kirsten Wickelgren**<sup>\*</sup>, Duke University (1203-19-36588)

**AMS Committee on Science Policy Panel Discussion on Artificial Intelligence and the Future of the Mathematical Sciences**

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FRIDAY, JANUARY 10 2:30PM-4:00PM 4C-3, Level Four, Seattle Convention Center Arch at 705 Pike

TBD

Organizers: **Brendan Hassett**, Brown University  
**Prof. Gunnar Erik Carlsson, Ph.D.**, Stanford University  
**Carla Cotwright-Williams**, AWM Executive Committee

**Jerry McNerney**, U. S. Congress, retired  
**Cynthia L Vinzant**, University of Washington, Seattle  
**Michelle Bernadette Snider**, IDA/Center for Computing Sciences  
**Kevin Beanland**, Washington & Lee University  
**Jesús A. De Loera**, Dept. of Mathematics, Univ. California  
**Zaid Harchaoui**, University of Washington, Seattle  
**Henry Kvinge**, Pacific Northwest National Laboratory  
**Kristin E. Lauter**, Facebook  
**Stacey Levine**, National Science Foundation  
**Keith Rush**, Google  
**Anita Benjamin**, American Mathematical Society

**Somdatta Goswami**, John Hopkins University  
**Justin Dong**, Lawrence Livermore National Laboratory

***TPSE Workshop: The Impact of AI in the Mathematics Curriculum, Teaching, and Research***

FRIDAY, JANUARY 10 3:00PM–4:30PM 4C-4, Level Four, Seattle Convention Center Arch at 705 Pike

In this interactive session, experts from the worlds of mathematics, education and technology will engage the audience through collaborative activities to discuss, and answer questions, about how mathematics is being impacted in the Age of AI, and how we, in the mathematical community, can learn how to use AI tools in our academic endeavors including research and teaching.

Organizers: **Oscar Vega**, California State University Fresno  
**Padmanabhan Seshaiyer**, George Mason University  
**Padmanabhan Seshaiyer**, George Mason University

***(322) AMS Maryam Mirzakhani Lecture - Alexander Wright, University of Michigan***

FRIDAY, JANUARY 10 3:20PM–4:25PM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

3:20PM (322.1) *Curve graphs and totally geodesic subvarieties of moduli spaces of Riemann surfaces*  
**Alexander Wright**, University of Michigan and **Francisco Arana-Herrera**, University of Maryland (1203-14-44712)

***(323) AMS - PME Undergraduate Student Poster Session, II***

FRIDAY, JANUARY 10 3:30PM–5:00PM Hall 4B, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Molly Moran**, Colorado College  
**Denise Taunton Reid**, Valdosta State University  
**Chad Awtrey**, Samford University

3:30PM ▶ ◆ (323.1) *Importance Sampling to Learn Vasopressor Dosage to Optimize Patient Mortality in an Interpretable Manner*  
**Anshul Vinay Rastogi**, University of Connecticut (1203-68-46035)

3:30PM OPEN

3:30PM ▶ ◆ (323.3) *Tile-based Graph Theoretical Modeling of Self-Assembling DNA of the Kayak Paddle Graphs*  
**Amanda Harsy Ramsay**, Lewis University and **Molly Paez**, Lewis University (1203-92-46038)

3:30PM ▶ (323.4) *Mixed Dimer Model for Exceptional Type Quiver Representations and Cluster Algebras*  
**Casey Tyler Appleton**, University of Illinois Urbana-Champaign, **Serena An**, Massachusetts

***(321) ASL Contributed Paper Session, I***

FRIDAY, JANUARY 10 3:00PM–5:00PM 2A, Level Two, Seattle Convention Center Arch at 705 Pike

Organizer: **Reed Solomon**, University of Connecticut

3:00PM ◆ (321.1) *Almost everywhere convergence theorems in harmonic analysis and algorithmic randomness*

**Diego Antonio Rojas**, Sam Houston State University (1203-03-42173)

3:15PM (321.2) *Countable Ordered Groups and Weihrauch Reducibility*

**Ang Li**, University of Wisconsin-Madison (1203-03-42250)

3:30PM (321.3) *The automorphism groups of countable short recursively saturated models of Peano Arithmetic*

**Ermek Nurkhaidarov**, Pennsylvania State University, Mont Alto and **Erez Shochat**, St. Francis College (1203-03-42821)

3:45PM ▶ (321.4) *The Well-foundedness of Cardinals and the Axiom of Choice*

**Dhruv Kulshreshtha**, University of Michigan (1203-03-39160)

4:00PM ▶ (321.5) *Diagonal Theorems on Ontological Modelling for P in an Extension of P*

**Sirdar Jawher Dizaye**, American Mathematical Society (1203-03-36765)

***JMM Workshop on Advances in Neural Operators and Uncertainty Quantification for Scientific Modeling***

FRIDAY, JANUARY 10 3:00PM–4:30PM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: **Amanda Howard**, Pacific Northwest National Laboratory

**Panagiotis Stinis**, Pacific Northwest National Laboratory

**Bamdad Hosseini**, University of Washington

- Institute of Technology, **Kayla Wright**, University of Oregon, **Elise Catania**, University of Minnesota and **Sogol Cyrusian**, UC Santa Barbara (1203-16-46039)
- 3:30PM  
▶ (323.5) *Barron Spaces with  $\text{ReLU}^k$  activation and Laplace's Equation on the half space with Dirichlet boundary*  
**Malhar Shashank Vaishampayan**, University of Pittsburgh (1203-35-46046)
- 3:30PM  
▶ (323.6) *Helly's Theorem and Its Variations in Linear Partitions*  
**Iris Ye**, Carnegie Mellon University and **Pablo Soberon**, Baruch College, City University of New York (1203-52-46047)
- 3:30PM  
▶ (323.7) *Bubbles and Fissures: Gap Formation in a Two-Dimensional Swarm Model*  
**Antonio Madrigal**, The College of New Jersey, **Anne Marie Warren**, University of Minnesota, Twin Cities and **Paige Yeung**, Massachusetts Institute of Technology (1203-37-46053)
- 3:30PM  
▶ ◆ (323.8) *Relaxed Infinite Skolem Sequences*  
**Sambhu Ganesan**, Lynbrook High School, **Jack Rosenthal**, Princeton, **Saman Farhat**, CUNY and **Saad Mneimneh**, City University of New York (1203-40-46055)
- 3:30PM  
▶ ◆ (323.9) *Accelerating Zero-Knowledge Proofs on Multithreaded CPUs*  
**Pariya A Akhiani**, University of California, Santa Barbara, **Mihir S Arya**, University of Michigan, Ann Arbor, **Michelle Contreras Catalan**, Amherst College and **Muhammad Zohaib Irfan**, National University of Sciences & Technology Pakistan (1203-94-46058)
- 3:30PM  
▶ ◆ (323.10) *Spectral characterization of the closed walk matrix and relation to the isomorphism problem*  
**Sajid Bin Mahamud**, Reed College (1203-05-46077)
- 3:30PM  
▶ (323.11) *Applications of the Reidemeister-Schreier Theorem*  
**Weston Andrew Hernandez Waggoner**, Cal State University of Fullerton (1203-55-46089)
- 3:30PM  
▶ ◆ (323.12) *Comparison of Algorithms for Uniformly Sampling Random Spanning Trees*  
**Chong Zhao**, Grinnell College, **Yuxin Peng**, Grinnell College, **Atticus Thacker**, Oberlin College, **Gregory Herschlag**, Duke University and **Eric A Autry**, Grinnell College (1203-68-46101)
- 3:30PM  
▶ (323.13) *Exploring Self-Grading in Mathematics: A Pedagogical Approach to Foster Metacognition in a College Mathematics Class*  
**Grace Martin**, Ohio Wesleyan University and **Matthew McCurdy**, University of the Virgin Islands (1203-97-46115)
- 3:30PM  
▶ (323.14) *A fast numerical method for the inverse medium scattering problem using multi-frequency measurements*  
**Gianluca Barone**, Rowan University (1203-35-46117)
- 3:30PM  
▶ (323.15) *Statistical experimental design and neural network-based modeling of human observer detection in magnetic resonance imaging (MRI)*  
**Sandro Amaglobeli**, Hofstra University and **Allison Rose Siegel**, Hofstra University (1203-62-46119)
- 3:30PM  
▶ ◆ (323.16) *The Metric Dimension of Generalized Theta Transformed Graphs*  
**David Martinez**, Baruch College and **Nicole Froitzheim**, Baruch College (1203-05-46131)
- 3:30PM  
▶ ◆ (323.17) *Evaluating Differential Time Complexity in Atomic Structure Algorithms with a Traveling Salesman Model of Macromolecules*  
**Ruikuan Zhu**, University of Washington, The Overlake School (1203-68-46138)
- 3:30PM  
▶ ◆ (323.18) *Enhancing Variational Autoencoders with Flexible Conditional Normalizing Flows*  
**Malia Walewski**, Emory University, **Rishi Leburu**, Emory University, **Claire Gan**, University of Nevada Reno and **Callihan Bertley**, The University of Texas at Austin (1203-68-46144)
- 3:30PM  
▶ (323.19) *Maxwell's 4th Integral Equation Model: Human Brain*  
**Sam Bielawa**, Roger Williams University and **Yajni Warnapala**, Roger Williams University (1203-65-46146)
- 3:30PM  
▶ (323.20)  *$k$ -Almost Consecutive Partitions and Quantum Jacobi Forms*  
**Amanda Folsom**, Amherst College, **John Joire**, Amherst College, **Alexandre van Lidth**, Amherst College and **Torin Steciuk**, Amherst College (1203-11-46152)
- 3:30PM  
▶ (323.21) *An algorithm for directly forceable graphs*  
**Kewen Yuan**, Mount Holyoke College, **Khanh Dinh**, Mount Holyoke College, **Jennifer Pham**, Mount Holyoke College, **Sarahjeen Paul**, Mount Holyoke College and **Derek Young**, Mount Holyoke College (1203-05-46197)
- 3:30PM  
▶ (323.22) *Augmented Reality and Artificial Intelligence for Learning Spatial Transformations*  
**Lucian R Chauvin**, Department of Mathematics, Texas A&M University, Department of Computer Science, Texas A&M University, **Philip B Yasskin**, Department of Mathematics, Texas A&M University, **Wei Yan**, Department of Architecture, Texas A&M University, **Luke Duane-Tessier**, Department of Mathematics, Ohio State University and **Preston Tranbarger**, Department of Mathematics, Rutgers University (1203-97-46203)
- 3:30PM  
▶ (323.23) *A Novel Iterative Method for Beam Focusing with an Antenna Array*  
**Macy Leslie Mosier**, Department of Mathematics, University of Houston and **Daniel Toader Onofrei**, Department of Mathematics, University of Houston (1203-00-46204)
- 3:30PM  
▶ (323.24) *A lower bound for the hyperbolicity of curve graphs*

- Ava Ostrem**<sup>\*</sup>, Rutgers University and **Mandy Unterhalter**<sup>\*</sup>, University of Virginia (1203-57-46208)
- 3:30PM  
▶ ◆  
(323.25) *Application of Model Averaging for Reliable Measurement in the Presence of Learning and Fatigue Effects with Stopping Rules*  
**Stephanie Lara-Sotelo**<sup>\*</sup>, California State University, Monterey Bay (1203-62-46215)
- 3:30PM  
▶ (323.26) *Locating a Runner on Some Snarks and Bipartite Graphs*  
**Reilly Lewis**<sup>\*</sup>, John Carroll University and **Viktoriya Taran**<sup>\*</sup>, John Carroll University (1203-05-46237)
- 3:30PM  
*OPEN*
- 3:30PM  
▶ (323.28) *Approximating Irrational Numbers and Points*  
**Nolan Eichorn**<sup>\*</sup>, Muhlenberg College and **Emmy Lin**, Boston University (1203-11-46256)
- 3:30PM  
▶ ◆  
(323.29) *Prime juggling patterns with a fixed state*  
**Steve Butler**, Iowa State University, **Vera Choi**, Tufts University, **Joel Jeffries**, Iowa State University, **Nina McCambridge**, Carnegie Mellon University, **Asia Morgenstern**<sup>\*</sup>, Westminster College and **Samuel Orellana Mateo**, Duke University (1203-05-46267)
- 3:30PM  
▶ ◆  
(323.30) *Exponential Sums With Genetic Algorithm*  
**Bobby Orozco**<sup>\*</sup>, California State University Fullerton (1203-11-46269)
- 3:30PM  
▶ (323.31) *Extremal Spectral Radii of Arithmetical Structures on Bident and Star Graphs*  
**Katie Noonan**<sup>\*</sup>, Villanova University, **Katie A Shattuck**<sup>\*</sup>, Villanova University and **Jean Carlos Garcia Colon**<sup>\*</sup>, University of Puerto Rico, Mayaguez (1203-15-46273)
- 3:30PM  
▶ (323.32) *Hearing Isolated Singularities in Dimension 4*  
**Nicholas Dominic Dill**<sup>\*</sup>, Lewis & Clark College and **Elizabeth Stanhope**, Lewis & Clark College (1203-53-46288)
- 3:30PM  
▶ (323.33) *Analysis of Crosstalk Networks related to Disease-Gene Associations*  
**Lea Choe**, Northeastern University, **Ravi Joseph Kingan**<sup>\*</sup>, Northeastern University and **Alana Marzigliano**, Northeastern University (1203-92-46289)
- 3:30PM  
▶ (323.34) *Stochastic Inference of Transmission Rates in SIR Models: A Comparative Study of Particle Filtering and pMCMC Methods*  
**Avery Chawner Drennan**<sup>\*</sup>, Northern Arizona University, **Jeffrey Moore Covington**, Northern Arizona University, **Dan Han**, University of Louisville, **Andrew Attilio**, Northern Arizona University, **Jaechoul Lee**, Northern Arizona University, **Joseph R Mihaljevic**, Northern Arizona University, **Eck R Doerry**, Northern Arizona University, **Richard G Posner**, Northern Arizona University and **Ye Chen**, Northern Arizona University (1203-34-46291)
- 3:30PM  
▶ (323.35) *Quantum metrics on vector-valued functions on intervals*
- Jade Jiao**<sup>\*</sup>, Pomona College and **Tai Fowler**<sup>\*</sup>, Pomona College (1203-46-46301)
- 3:30PM  
▶ (323.36) *COTWISTED AND WARPED TENSOR PRODUCTS OF FROBENIUS ALGEBRAS*  
**Rohan Das**<sup>\*</sup>, BASIS Independent Silicon Valley, MIT PRIMES (1203-18-46302)
- 3:30PM  
▶ (323.37) *Differential Powers in Semigroup and Polynomial Rings*  
**Sogol Cyrusian**<sup>\*</sup>, UC Santa Barbara, **Nzingha Joseph**, Carleton College, **Zachary Medlin**, Mercer University, **Saskia Solotko**, Tufts University and **Mengyuan Yang**<sup>\*</sup>, Swarthmore College (1203-13-46303)
- 3:30PM  
▶ (323.38) *Alternating Harmonic Series Grouped by Fibonacci and Triangular Numbers*  
**Matthew D Blake**<sup>\*</sup>, St. Olaf College (1203-40-46304)
- 3:30PM  
▶ (323.39) *Enhancing Real-Time Epidemiological Forecasting with log Particle Filters and Changepoint Detection*  
**Andrew Attilio**<sup>\*</sup>, Northern Arizona University, **Ye Chen**, Northern Arizona University, **Jeffrey Moore Covington**, Northern Arizona University, **Eck R Doerry**, Northern Arizona University, **Avery Chawner Drennan**, Northern Arizona University, **Dan Han**, University of Louisville, **Jaechoul Lee**, Northern Arizona University, **Joseph R Mihaljevic**, Northern Arizona University and **Richard G Posner**, Northern Arizona University (1203-92-46305)
- 3:30PM  
▶ (323.40) *An Investigation into Infinite n-Copy Skolem Sequences*  
**Ben Gildea**<sup>\*</sup>, UC Berkeley (undergraduate student), **Saman Farhat**, CUNY and **Saad Mneimneh**, City University of New York (1203-40-46307)
- 3:30PM  
▶ ◆  
(323.41) *Modeling Strategic Subgroup Behaviors in Team Assembly; the Contrast Between Six and Seven*  
**Malaya Jove**<sup>\*</sup>, University of Washington Tacoma (1203-91-46309)
- 3:30PM  
▶ (323.42) *Long Paths in Polynomial Divisor Graphs: Lower Bound*  
**Jay Calkins**<sup>\*</sup>, Towson University and **Kayla Traxler**<sup>\*</sup>, University of Wisconsin - La Crosse (1203-11-46310)
- 3:30PM  
▶ (323.43) *Counting Hamiltonian cycles in quartic circulant graphs*  
**Allison E Hilliard**<sup>\*</sup>, Pepperdine University and **Joshua P. Bowman**, Pepperdine University (1203-05-46317)
- 3:30PM  
▶ (323.44) *Kemeny's constant for nonbacktracking random walks on the vertices of a graph*  
**Matthew Wallace Shumway**<sup>\*</sup>, Brigham Young University, **Adam Knudson**, Brigham Young University, **Mark Kempton**, Brigham Young University and **Jane Breen**, Ontario Tech University (1203-05-46318)

- 3:30PM  
▶ ◆  
(323.45) *Exact Factorizations of G-crossed Braided Fusion Categories*  
**Sargam Mondal**<sup>\*</sup>, MIT PRIMES-USA, Rutgers, The State University of New Jersey, **Julia Yael Plavnik**, Indiana University and **Monique Muller Lopes Rocha**, Universidade Federal De Sao Jo (1203-18-46319)
- 3:30PM  
▶ (323.46) *A Mathematical Study of Glioblastoma Using CompuCell3D*  
**Ashna Lillian Dagam**<sup>\*</sup>, Brookfield Academy, Brookfield, WI and **Laura P. Schaposnik**, University of Illinois at Chicago (1203-92-46320)
- 3:30PM  
▶ (323.47) *Explorer Director Game on Paths*  
**Paddy Yang**<sup>\*</sup>, Cooper Union and **Abigail Raz**, Cooper Union (1203-05-46322)
- 3:30PM  
▶ (323.48) *Expanding polynomials for sets with additive structure*  
**Sanjana Das**<sup>\*</sup>, Massachusetts Institute of Technology, **Cosmin Pohoata**, Emory University and **Adam Sheffer**, Baruch College (1203-05-46326)
- 3:30PM  
▶ (323.49) *Analyzing Free Parameter Predictor-Corrector Multistep Methods*  
**Zoe Erpelding**<sup>\*</sup>, Gonzaga University (1203-65-46328)
- 3:30PM  
▶ ◆  
(323.50) *Counting p-adic Roots for Circuit Systems*  
**Joshua Goldstein**, Texas A&M, **Prof. J. Maurice Rojas, Ph.D.**, Texas A&M University, **Henry Stone**, University of Michigan, Ann Arbor and **Arnaldo Jose Vera**<sup>\*</sup>, University of Puerto Rico, Mayagüez Campus (1203-14-46330)
- 3:30PM  
▶ (323.51) *Variations of Prime 2-Ball Juggling Patterns*  
**Steve Butler**, Iowa State University, **Vera Choi**, Tufts University, **Joel Jeffries**, Iowa State University, **Nina McCambridge**<sup>\*</sup>, Carnegie Mellon University, **Asia Morgenstern**, Westminster College and **Samuel Orellana Mateo**<sup>\*</sup>, Duke University (1203-05-46607)
- 3:30PM  
▶ ◆  
(323.52) *On Sum-Free Functions: A Protective Property Against Cryptanalysis*  
**Alyssa Ebeling**<sup>\*</sup>, Wisconsin Lutheran College, **Ashley Rydell**, Sonoma State University, **Xiang-Dong Hou**, University of South Florida and **Shujun Zhao**, University of South Florida (1203-12-46333)
- 3:30PM  
▶ (323.53) *Climate Change's Effect on Red-Bellied Woodpeckers*  
**Lucia Raciti**<sup>\*</sup>, Saint Mary's College, Notre Dame IN USA, **Pushpi Paranamana**, Saint Mary's College, Notre Dame IN USA and **Joel Ralston**, Saint Mary's College, Notre Dame IN USA (1203-62-46334)
- 3:30PM  
▶ ◆  
(323.54) *Automorphism Group of Semilinear Rank Metric Code*  
**Alexandra Levinshteyn**<sup>\*</sup>, University of Illinois, Urbana-Champaign, **Milan Tenn**<sup>\*</sup>, Swarthmore College and **Lukas Kolsch**, University of South Florida (1203-94-46335)
- 3:30PM  
▶ (323.55) *Orientation Dynamics in Space Flight Mechanics*  
**Erin E Clement**<sup>\*</sup>, California State University, Fullerton and **Nicholas Brubaker**, California State University, Fullerton (1203-37-46336)
- 3:30PM  
▶ (323.56) *The Approximability of Commutative Rank over Finite Fields*  
**Marcus Ching Gozon**<sup>\*</sup>, University of Michigan, Ann Arbor, MI and **Guy Moshkovitz**, Department of Mathematics, City University of New York (Baruch College)" (1203-68-46341)
- 3:30PM  
▶ (323.57) *Classification of Well-Edge-Dominated Graphs of Girth Four*  
**Jake Berg**, Yale University, **Perryn Chang**, Yale University, **Claire Kaneshiro**, Princeton University, **Isabel Renteria**<sup>\*</sup>, Loyola University Chicago and **Sumi Vora**, Pomona College (1203-05-46345)
- 3:30PM  
*OPEN*
- 3:30PM  
▶ ◆  
(323.59) *Efficient Route Planning between Stations in New York City: A Dijkstra Algorithm Approach*  
**Alice Nguyen**<sup>\*</sup>, University of the Pacific, **Prabheen Gill**<sup>\*</sup>, University of the Pacific, **Emi Sayuri Gonzales**<sup>\*</sup>, University of the Pacific and **Emily Greene**, University of the Pacific (1203-05-46346)
- 3:30PM  
▶ ◆  
(323.60) *A mathematical model of neuropeptide-elicited rhythmic oscillations*  
**Isabelle A Bautista**<sup>\*</sup>, Saint Peter's University and **Nickolas Kintos**, Saint Peter's University (1203-92-46347)
- 3:30PM  
▶ ◆  
(323.61) *Lower Order Ideals of Length-Three Sequences under Stable Tamari Order*  
**Tahda Queer**<sup>\*</sup>, Hunter College, City University of New York, **Djeneba Diop**<sup>\*</sup>, Hobart and William Smith Colleges and **Anna Pun**, CUNY Graduate Center, CUNY Baruch College (1203-06-46349)
- 3:30PM  
▶ (323.62) *Counting Subgroups of Finite Abelian P-Groups*  
**Jessica A Cotturone**<sup>\*</sup>, Augustana College and **Andrew Sward**, Augustana College (1203-20-46351)
- 3:30PM  
▶ (323.63) *Discrete Wavelet Transform based Parallel Hybrid Deep Learning Model for forecasting El Niño-Southern Oscillation Cycles*  
**Winston Zhou**<sup>\*</sup>, Danbury Math Academy (1203-86-46354)
- 3:30PM  
▶ ◆  
(323.64) *The Impact of Early Life Adversity on Mental Health Outcomes: Results from the ABCD Study (Poster Presentation)*  
**Hannah Graff**<sup>\*</sup>, Creighton University (1203-62-46356)
- 3:30PM  
▶ (323.65) *Local-Global Conjecture Within Circle Packings*  
**Jeffrey Zhirui Zhang**<sup>\*</sup>, Swarthmore College, **Ham Williams-Tracy**<sup>\*</sup>, Swarthmore College, **Hanqi Shi**<sup>\*</sup>, Swarthmore College, **Wenyuan Shi**<sup>\*</sup>, Swarthmore College and **Ian Whitehead**<sup>\*</sup>, Swarthmore College (1203-11-46357)

- 3:30PM *Upper and Lower Bounds on Several Cut Numbers in Hypergraphs via Randomized Contraction*  
▶ (323.66) **William Zhao**<sup>\*</sup>, Dougherty Valley High School and **Yuchong Pan**, MIT (1203-05-46358)
- 3:30PM *Disconnected Cliques in Derangement Graphs*  
▶ (323.67) **Sara Anderson**<sup>\*</sup>, California State University, Fullerton, **William Casper**, California State University Fullerton, **Sam Fleishman**, California State University Fullerton and **Matt Rathbun**, California State University, Fullerton (1203-05-46362)
- 3:30PM *Effects of the Linear Trend Term in the Social Media-Based Monthly Park Visitation Model*  
▶ (323.68) **Sydney Leilani Campbell**<sup>\*</sup>, Western Washington University and **Kimihiro Noguchi**, Western Washington University (1203-62-46363)
- 3:30PM *Upper Bound for Longest Path in Polynomial Divisor Graph*  
▶ (323.69) **Nicole Froitzheim**<sup>\*</sup>, Baruch College and **Jonathan Parlett**<sup>\*</sup>, Drexel University (1203-11-46364)
- 3:30PM *Arithmetical Structures on Cycles with a Double Edge*  
▶ (323.70) **Juliana Isabel Castrodad-Garcia**<sup>\*</sup>, University of Puerto Rico- Mayaguez Campus, **Chloe Abo**, Villanova University and **Diego Estrada-Rivera**, University of Puerto Rico- Rio Piedras Campus (1203-05-46368)
- 3:30PM *Interlacing of Zeros of Odd Period Polynomials*  
▶ (323.71) **Jennifer Mackenzie**<sup>\*</sup>, Clemson University, **Grace Ko**<sup>\*</sup>, Vanderbilt University and **Hui Xue**, Clemson University (1203-11-46370)
- 3:30PM *OPEN*
- 3:30PM *Approximate Infinite Skolem Sequences*  
▶ (323.73) **Aahan Chatterjee**<sup>\*</sup>, University of Waterloo and **Saad Mneimneh**<sup>\*</sup>, City University of New York (1203-11-46374)
- 3:30PM *A deep learning-based method for solving an inverse medium scattering problem*  
▶ (323.74) **Christina Michele Quinn**<sup>\*</sup>, Rowan University (1203-35-46376)
- 3:30PM *Parametric Integral Transforms and their Applications*  
▶ (323.75) **Earth Sonrod**<sup>\*</sup>, Ithaca College and **Osman Yurekli**, Ithaca College (1203-44-46377)
- 3:30PM *Counting Semi-Perfect Sudoku Puzzles*  
▶ ◆ (323.76) **Brynn A Nelson**<sup>\*</sup>, Linfield University and **Sydney Pflieger**<sup>\*</sup>, Linfield University (1203-05-46381)
- 3:30PM *Distinct Distances on Families of Ruled Surfaces in  $R^3$*   
▶ (323.77) **Alexander J. Balseira**<sup>\*</sup>, Baruch College (1203-52-46382)
- 3:30PM *Embedding equitable  $(s,p)$ -edge-colorings of  $\mathcal{K}_n$*   
▶ (323.78) **Stacie Baumann**, College of Charleston, **Mika Olufemi**<sup>\*</sup>, College of Charleston and **Stafford R Yerger**<sup>\*</sup>, College of Charleston (1203-05-46387)
- 3:30PM *OPEN*
- 3:30PM *OPEN*
- 3:30PM *OPEN*
- 3:30PM *OPEN*
- 3:30PM *The L-functions recipe for moments requires raw ingredients*  
▶ (323.83) **Skyler C. Le**<sup>\*</sup>, Bucknell University (1203-11-46398)
- 3:30PM *Study of Patterns Within Number Bracelets*  
▶ (323.84) **Aakash Pandey**<sup>\*</sup>, Saint Peter's University, New Jersey Epsilon (1203-97-46403)
- 3:30PM *An Analysis of MLB Ballparks, what factors are most important?*  
▶ (323.85) **Ryan Manikowski**<sup>\*</sup>, Lewis University (1203-102-46405)
- 3:30PM *Virtual Reality Simulation of Knot Deformation*  
▶ (323.86) **Jake Williams**<sup>\*</sup>, Oklahoma State University (1203-57-46406)
- 3:30PM *Building Games on Grid Graphs*  
▶ (323.87) **Amelia Bresnahan**<sup>\*</sup>, Lewis University and **Dayanna Sanchez**<sup>\*</sup>, Lewis University (1203-05-46409)
- 3:30PM *Estimation of Mean and Standard Deviation Given Percentiles under Normality Assumption*  
▶ ◆ (323.88) **Jessica Lizbeth Naranjo**<sup>\*</sup>, California State University Monterey Bay, **Kyra Batarse**, California State University Monterey Bay, **Jakob Garcia**, California State University Monterey Bay and **Steven Kim**, California State University Monterey Bay (1203-62-46410)
- 3:30PM *Infinite Free Resolutions Over Certain Families of Numerical Semigroup Algebras*  
▶ (323.89) **Timothy Cho**<sup>\*</sup>, University of California, Irvine, **Kieran Favazza**<sup>\*</sup>, Saint Louis University, **Aleister Jones**<sup>\*</sup>, University of Washington, Seattle, **Nzingha Joseph**<sup>\*</sup>, Carleton College and **Molly MacDonald**<sup>\*</sup>, Notre Dame University (1203-05-46413)
- 3:30PM *A Combinatorial Study of the Game Triominoes*  
▶ (323.90) **Valon Draco Haslem**<sup>\*</sup>, Gonzaga University, **Katharine Shultis**, Gonzaga University, **Hays Whitlatch**, Gonzaga University, **Zoe Erpelding**, Gonzaga University and **Diana Hoppe**, Gonzaga University (1203-102-46414)
- 3:30PM *Information Diffusion on Iterated Graph Models*  
▶ ◆ (323.91) **Christopher James Brice**<sup>\*</sup>, Columbia University and **Nhat-Dinh Nguyen**<sup>\*</sup>, CUNY, The City College of New York (1203-05-46415)
- 3:30PM *Generalized Quandle Polynomials and Their Applications to Stuquandles, Stuck Links, and RNA Folding*  
▶ (323.92) **Ekaterina Bondarenko**<sup>\*</sup>, Hamilton College (1203-57-46416)

- 3:30PM  
▶ ◆  
(323.93) *R-Secant Method with BB steps and a Nonmonotone Linesearch for Nonsmooth Optimization*  
**Linsen Liu**<sup>\*</sup>, Contributory, University of Maryland-College Park, **Paul Trey Wilhoit**<sup>\*</sup>, Roanoke College, Contributory and **Jordan Tierney**<sup>\*</sup>, Colorado School of Mines, Contributory (1203-49-46417)
- 3:30PM  
▶ ◆  
(323.94) *Examples of the Reflective Algebra for Various Hopf Algebras*  
**Emma Yang**<sup>\*</sup>, Stuyvesant High School, **Julia Yael Plavnik**<sup>\*</sup>, Indiana University and **Hector Martin Pena Pollastri**, Indiana University (1203-16-46418)
- 3:30PM  
▶ (323.95) *A Faster Approximation Algorithm for the  $k$ -Way Cut Problem in Low-Rank Hypergraphs via Multiplicative Weight Update*  
**Christopher Bao**<sup>\*</sup>, The Davidson Academy and **Yuchong Pan**, MIT (1203-68-46420)
- 3:30PM  
▶ (323.96) *Predicting Bird Populations Using the Fractal Dimension of Forest Canopies*  
**Lydia Tillapaugh**<sup>\*</sup>, Christopher Newport University and **Matthew Morena**, Christopher Newport University (1203-104-46423)
- 3:30PM  
▶ (323.97) *On Triangulations of Order Polytopes for Snake Posets*  
**Molly Bradley**<sup>\*</sup>, University of Pennsylvania, **Aleister Jones**<sup>\*</sup>, University of Washington, Seattle, **Mario Tomba**<sup>\*</sup>, Dartmouth College and **Katherine Tung**<sup>\*</sup>, Harvard University (1203-52-46425)
- 3:30PM  
▶ (323.98) *Electric Potential of a Torus Knot Along the Axis*  
**Henry Jiang**<sup>\*</sup>, MIT PRIMES-USA (1203-31-46426)
- 3:30PM  
▶ (323.99) *A Structural Analysis of Largest Independent Sets in a Family of Circulant Graphs. Advisor: Dr. Anil Shende.*  
**Moazzam Maan**<sup>\*</sup>, Roanoke College (1203-05-46428)
- 3:30PM  
▶ (323.100) *Accelerating Zero-Knowledge Virtual Machines with ideas from Computer Architecture*  
**Celine Zhang**<sup>\*</sup>, MIT PRIMES, Phillips Exeter Academy and **Eric Archerman**<sup>\*</sup>, MIT PRIMES, The Roxbury Latin School (1203-94-46429)
- 3:30PM  
▶ (323.101) *Improved Analysis of the Branching Contraction Algorithm for the Unweighted Hypergraph Minimum  $k$ -Way Cut Problem*  
**Joshua Thomas Wang**<sup>\*</sup>, Brookfield Central High School and **Yuchong Pan**, MIT (1203-68-46430)
- 3:30PM  
▶ ◆  
(323.102) *Des Moines Policing: Analyzing Racial Bias in Traffic Citations and Arrests*  
**Hanmo Jing**<sup>\*</sup>, Grinnell College, **Maria Christina Rodriguez**<sup>\*</sup>, Grinnell College and **Eric A Autry**, Grinnell College (1203-62-46431)
- 3:30PM  
▶ ◆  
(323.103) *Interactions Between the Frequency of the Duffy Antigen and the Dynamics of  $P. vivax$  Malaria Infections*
- 3:30PM  
▶ (323.104) *Quantum-sound property tests for linear and affine linear functions*  
**David Cui**, Massachusetts Institute of Technology and **Jerry Zhang**<sup>\*</sup>, Bellaire High School (1203-68-46435)
- 3:30PM  
▶ (323.105) *The Shape of Data: Mathematical Visualization Methods to Understand SAR Datasets*  
**Johannes Athanasius Bauer**<sup>\*</sup>, Sandia National Laboratories (1203-68-46437)
- 3:30PM  
▶ ◆  
(323.106) *Roots of Real-Valued Zero-Mean Maps*  
**Francesca Cantor**<sup>\*</sup>, Swarthmore College, **Julia D'Amico**<sup>\*</sup>, Reed College, **Florian Frick**, Carnegie Mellon University and **Eric Myzelev**<sup>\*</sup>, University of Pennsylvania (1203-55-46439)
- 3:30PM  
▶ (323.107) *A Statistical Learning Model for Risk Management of Remote Work*  
**Jessica Nyitrai**<sup>\*</sup>, Western Connecticut State University (1203-90-46440)
- 3:30PM  
▶ (323.108) *Bounds on Abelian Group Presentations and Vertex Number of Simplicial Complexes with Design Matrix Methods*  
**Hongyi Zhang**<sup>\*</sup>, Haverford College, **Preston Bushnell**<sup>\*</sup>, Harvard University and **Florian Frick**, Carnegie Mellon University (1203-15-46441)
- 3:30PM  
▶ (323.109) *The Distribution of Non-Trivial Zeros of the Riemann Zeta Function*  
**Chase Stephenson**<sup>\*</sup>, Linfield University (1203-11-46443)
- 3:30PM  
▶ (323.110) *Using Bernstein polynomials in trajectory optimization*  
**Philippe S Jay**<sup>\*</sup>, University of Iowa, **Venanzio Cichella**, University of Iowa and **Maxwell W Hammond**, University of Iowa (1203-49-46445)
- 3:30PM  
▶ (323.111) *Assessing Spatiotemporal Patterns in Ocean Currents through Complex Empirical Orthogonal Functions and Lagrangian Coherent Structures*  
**Rapha Coutin**<sup>\*</sup>, California Polytechnic State University San Luis Obispo, **Corbin V Luoma**<sup>\*</sup>, California Polytechnic State University San Luis Obispo, **Andres Rocha**, California Polytechnic State University San Luis Obispo, **Casper Pratt**, California Polytechnic State University San Luis Obispo, **Mazen Idriss**, California Polytechnic State University San Luis Obispo, **Leah Hoogstra**, FIS, California Polytechnic State University San Luis Obispo, **Ryan K Walter**, California Polytechnic State University San Luis Obispo and **Paul F Choboter**, California Polytechnic State University San Luis Obispo (1203-76-46452)

- 3:30PM *Saturation of 0-1 Matrices*  
▶ **Andrew Brahms**<sup>\*</sup>, MIT PRIMES-USA, **Alan Duan**<sup>\*</sup>, MIT PRIMES-USA and **Jacob Greene**<sup>\*</sup>, MIT PRIMES-USA (1203-05-46455)
- 3:30PM *Neural Networks and Neural Operators for the Committor Problem*  
▶ (323.113) **Alkiviades Boukas**<sup>\*</sup>, Cornell University, **Bill Yunkai Chen**<sup>\*</sup>, Northwestern University and **Maria Kourkina Cameron**, University of Maryland (1203-65-46458)
- 3:30PM *Modeling Financial Losses in Aviation Due to Severe Weather: A Differential Equation Approach*  
▶ (323.114) **Fatima Hernandez**<sup>\*</sup>, University of the Incarnate Word (1203-35-46466)
- 3:30PM *Robustness of an Agent-Based Model on Cardiac Action Potentials*  
▶ ◆ (323.115) **Bernette Chan**<sup>\*</sup>, California Polytechnic State University San Luis Obispo, **Mackenzi Mehlberg**, California Polytechnic State University San Luis Obispo and **Joyce Lin**, Cal Poly State University (1203-92-46468)
- 3:30PM *Algorithmic Generation of Paths for Specified Vertices on Dynamic Graphs*  
▶ ◆ (323.116) **Ms. Katelyn Buck**<sup>\*</sup>, The University of Texas at Austin (1203-05-46475)
- 3:30PM *Topology of Sequences up to the Indices of Repeated Elements*  
▶ (323.117) **Elijah James Guptill**<sup>\*</sup>, Cal Poly San Luis Obispo (1203-06-46478)
- 3:30PM *Labelled Graph Inverse Semigroups*  
▶ ◆ (323.118) **Mathieu John Yves Chabaud**<sup>\*</sup>, University of Washington, **Stian Du Preez**<sup>\*</sup>, Rice University, **Nicolas Goluboff**<sup>\*</sup>, University of Massachusetts and **David Milan**, University of Texas at Tyler (1203-20-46479)
- 3:30PM *Modeling Sign-In Times: Real-World Assessment of Probability Distributions for Analyzing Time Intervals*  
▶ ◆ (323.119) **Chiana Griswa**<sup>\*</sup>, University of The Pacific and **Alice Nguyen**, University of The Pacific (1203-62-46480)
- 3:30PM *On the  $SpS$ -Parts of Character Degrees and Regular Orbits of Primitive Permutation Groups*  
▶ (323.120) **Cecilia Sun**<sup>\*</sup>, Yale University, **Richard Li**<sup>\*</sup>, Cornell University, **Andrew Jason Butler**<sup>\*</sup>, University of Wisconsin-Madison, **David Martinez**<sup>\*</sup>, CUNY Baruch College and **Yong Yang**, Texas State University (1203-20-46481)
- 3:30PM *Markoff Triples Modulo  $SpS$*   
▶ ◆ (323.121) **Claire Elizabeth Dunn**<sup>\*</sup>, Oregon State University, **Vernon Naidu**<sup>\*</sup>, San Francisco State University, **Alette Wells**<sup>\*</sup>, Yale University and **Elisa Bellah**, University of Toronto (1203-11-46484)
- 3:30PM *Private Fund Equity Risk Modelling via Markov Chain Monte Carlo Methods*  
▶ (323.122) **Samuel Ho-Ching Kwan**<sup>\*</sup>, Rice University, **Mehdi Hachimi**, Ecole Polytechnique Federale de Lausanne, **Jonathan Greer**, Howard University and **Gulshyray Auezbaeva**, Karakalpak State University (1203-90-46486)
- 3:30PM *Modeling Electrical Fields with Wolfram Language*  
▶ ◆ (323.123) **Anne Deyu Shuai**<sup>\*</sup>, Oviedo High School, Florida and **Jenny Wang**<sup>\*</sup>, Camas High School, Washington (1203-70-46489)
- 3:30PM *Modeling Decision-Making with Conflicting Physiological Needs*  
▶ ◆ (323.124) **Owen Tolbert**<sup>\*</sup>, University of Maryland, Baltimore County and **Michele Nardin**, Howard Hughes Medical Institute - Janelia Research Campus (1203-68-46498)
- 3:30PM *OPEN*
- 3:30PM *An Investigation of The Lavrentiev Phenomenon*  
▶ (323.126) **Christophe Leblanc**<sup>\*</sup>, Kenyon College (1203-49-46511)
- 3:30PM *On Asymmetric Colorings of Graphs*  
▶ (323.127) **Tejas Gautam Shende**<sup>\*</sup>, Indian Institute of Technology Bombay, **Evan Frankel**, Swarthmore College, **Bruno Aguilar**, Universidad Nacional Autónoma de México, **Yi Wang**, University of Michigan and **Kyle Wah` Pon**, University of California, San Diego (1203-05-46514)
- 3:30PM *A Machine Learning Based Approach for Reverse Engineering a Biomathematical Model of Parkinson's Disease Intracellular Processes*  
▶ (323.128) **Toni Giovenelli McCoy**<sup>\*</sup>, Salve Regina University and **Edward T Dougherty**, Salve Regina University (1203-92-46523)
- 3:30PM *A Stochastic Mathematical Model of Transcranial Electrical Stimulation for Neurodegenerative Disorders*  
▶ (323.129) **Morgan K Peritz**<sup>\*</sup>, Salve Regina University and **Edward T Dougherty**, Salve Regina University (1203-92-46524)
- 3:30PM *Novel Spectral Graph Clustering Algorithm on Signed Graphs*  
▶ ◆ (323.130) **Paola Viviana Campos**<sup>\*</sup>, California State University, Stanislaus, **Alexander Cloninger**, UCSD and **Haidee Ruvalcaba**, California State University, Northridge (1203-05-46529)
- 3:30PM *Extremal Number Of Arborescences*  
▶ (323.131) **Benjamin Mascuch**<sup>\*</sup>, Tufts University and **Aditya Bandekar**<sup>\*</sup>, University of Toronto (1203-05-46530)
- 3:30PM *Modeling Migration Patterns of Northern Pacific Humpback Whales*  
▶ ◆ (323.132) **Jacob Wayne Proulx**<sup>\*</sup>, Emmanuel College, Boston, MA, **Lydia G Vann**<sup>\*</sup>, Emmanuel College, Boston, MA, **Benjamin Allen**, Emmanuel College, Boston, MA, **Christine Sample**, Emmanuel College, Boston, MA, **Yulia Dementieva**, Emmanuel College, Boston, MA and **Ester Quintana**, Emmanuel College, Boston, MA (1203-92-46532)
- 3:30PM *OPEN*

- 3:30PM *OPEN*
- 3:30PM *The Quest for VE-EL: A Formally Verified and Enhanced  $\lambda$ -Calculus Reasoner*  
▶ (323.135) **Nalen Jay Rangarajan\***, Konkordant Lab, Department of Computer Science, Kansas State University, Manhattan KS 66506, **Atalay Mert ileri**, Konkordant Lab, Department of Computer Science, Kansas State University, Manhattan KS 66506, **Jack Cannell**, Konkordant Lab, Department of Computer Science, Kansas State University, Manhattan KS 66506 and **Hande Küçük McGinty**, Konkordant Lab, Department of Computer Science, Kansas State University, Manhattan KS 66506 (1203-68-46543)
- 3:30PM *Analysis of time series data from swimming fish, orientation of the principal components in a high-dimensional data*  
▶ (323.136) **Yina Tang\***, Grove City College and **Winona Wherley\***, Grove City College (1203-15-46545)
- 3:30PM *Generating Finetuned Models Using Implicit Neural Representation*  
▶ ◆ (323.137) **Adam Sayyed\***, University of Maryland Baltimore-County (1203-68-46549)
- 3:30PM *Traveling Waves in an Epidemiological Model with Repeated Infection*  
▶ (323.138) **Jonathan Waldmann\***, Miami University (1203-37-46550)
- 3:30PM *Math Department Scheduling Using Linear Programming*  
▶ (323.139) **Brynn Violet Bergeson\***, University of Wisconsin - Eau Claire and **Annabelle Piotrowski\***, University of Wisconsin - Eau Claire (1203-90-46552)
- 3:30PM *Comparing Methods of Opportunistic Risk Limiting Audits*  
▶ (323.140) **Rohith Raghavan\***, Sharon High School, MIT PRIMES and **Eric Chen\***, MIT PRIMES, Acton Boxborough Regional High School (1203-62-46556)
- 3:30PM *An Empirical Evaluation of Convergence to Correlated Equilibria: Introducing Multi-Stage Multiplicative-Weights Update*  
▶ (323.141) **Michael Han\***, Lexington High School, MIT PRIMES and **Ashley Yu\***, MIT PRIMES, Concord Academy (1203-91-46559)
- 3:30PM *Maximizing the Functional Dimension of ReLU Neural Networks: Probabilities of Stably Unactivated Neurons*  
▶ (323.142) **Ethan Montes\***, Wofford College, Towson University, **Gabriel B. Quijano\***, Auburn University, **Grace Stulman\***, Towson University and **Natalie Brownlowe\***, Towson University (1203-60-46560)
- 3:30PM *Analyzing Electoral Fairness in Thailand's Multi-Party System: A Computational Approach*  
▶ ◆ (323.143) **That Prommolmard\***, Grinnell College and **Eric A Autry**, Grinnell College (1203-62-46562)
- 3:30PM *Investigating the Dimensional Effects on Thomas Cyclic Systems*  
▶ (323.144) **Taylor Marie Keesler\***, University of Central Florida (1203-34-46565)
- 3:30PM *Particle-Laden Flows: Erosion Experiments and Machine Learning Analysis*  
▶ ◆ (323.145) **Isaias Bahena Sahagun\***, Wake Forest University Undergraduate Student and **Jacob Riley Kathman\***, Wake Forest University Undergraduate Student (1203-76-46571)
- 3:30PM *Anti-van der Waerden Number of Tadpole Graphs and Graph Products of Tadpole Graphs with Paths*  
▶ ◆ (323.146) **John Jesus Caceres\***, Quinnipiac University (1203-05-46574)
- 3:30PM *Exploring Mandelbrot Escape Velocity*  
▶ (323.147) **Eliza Brown\***, St. Lawrence University (1203-102-46576)
- 3:30PM *Promotion is Flipping Cool!*  
▶ ◆ (323.148) **Leila Katharine Cowan\***, Smith College (1203-05-46579)
- 3:30PM *Temporal Analysis of the New Jersey CitiBike Network*  
▶ (323.149) **Emma Claire Erdtmann\***, Stevens Institute of Technology (1203-05-46580)
- 3:30PM *Exploring  $r$ -Stars in Three-Dimensional Grid Graphs: Center Shifts and Dimensional Influences*  
▶ ◆ (323.150) **Eduardo Chamorro\***, California State University, Stanislaus, **Jessica De Silva**, California State University, Stanislaus and **Leonardo Morales\***, California State University, Stanislaus (1203-05-46581)
- 3:30PM *A Wavelet-Based Keystoneness Species Analysis of Microbiome Correlations and Causalities of Complex Diseases*  
▶ (323.151) **Adeethya Shankar\***, Brown University, **Tong Liu**, Tsinghua University, **Yongzhong Zhao**, Frontage Labs and **Xiaodi Wang**, Western Connecticut State University (1203-92-46582)
- 3:30PM *Secondary Teachers' Use of the Transport Model: Evaluating the Importance of Real Analysis for Teaching*  
▶ (323.152) **Jonah Gent\***, George Fox University and **Levi Western\***, George Fox University (1203-97-46585)
- 3:30PM *Better b-ball Bouncing Bounds*  
▶ ◆ (323.153) **Vera Choi\***, Tufts University, **Samuel Orellana Mateo**, Duke University, **Nina McCambridge**, Carnegie Mellon University and **Asia Morgenstern**, Westminster College (1203-05-46586)
- 3:30PM *AGM and Elliptic Curves Over Arbitrary Finite Fields*  
▶ (323.154) **June Kayath**, Massachusetts Institute of Technology, **Connor Lane\***, Rose-Hulman Institute of Technology, **Ben Neifeld**, William and Mary, **Tianyu Ni**, Clemson University and **Hui Xue**, Clemson University (1203-11-46595)

3:30PM *A Topological Approach to Understanding the Development of Knowledge Networks*  
 ▶ (323.155) **Gavin Engelstad**<sup>\*</sup>, Macalester College, **Frances Claire McConnell**<sup>\*</sup>, Macalester College, **Russell Funk**, University of Minnesota, **Lucia Luo**, Macalester College, **Jason Owen-Smith**, University of Michigan, **Ethan Scheelk**, Macalester College and **Lori Beth Ziegelmeier**, Macalester College (1203-55-46596)

3:30PM *Using Real-Variable Techniques to Study Harmonic Polynomials*  
 ▶ (323.156) **Eli Joseph Sampson**<sup>\*</sup>, Brigham Young University Department of Mathematics (1203-30-46597)

3:30PM *Genus-0 Virtual Braids*  
 ▶ (323.157) **Jerry Gao**<sup>\*</sup>, Vanderbilt University, **Jacob Guynee**, Georgia Tech, **Alberto Magana**<sup>\*</sup>, Vanderbilt University and **Isaiah Williams**<sup>\*</sup>, Vanderbilt University (1203-57-46599)

3:30PM *Gabor B-spline System Function Approximation*  
 ▶ ◆ (323.158) **Mateusz Andrzej Zubrzycki**<sup>\*</sup>, Tufts University and **Kelvin E Guobadia**<sup>\*</sup>, Tufts University (1203-06-46601)

3:30PM *Differentiating Point Cloud Distributions Using Persistence Homology*  
 ▶ (323.159) **Jason Mao**<sup>\*</sup>, PRIMES-USA (1203-55-46602)

3:30PM *Back-and-Forth Optimal Transport for Generative Models*  
 ▶ ◆ (323.160) **Virginia Do**, Haverford College, **Sam Hu**<sup>\*</sup>, Swarthmore College, **Giulio Trigila**, Baruch College, **Ricardo Baptista**, Caltech, **Tanya Wang**, New York University, **Jeet Vashisht**, The University of North Carolina at Chapel Hill, **Bhargavi Patil**, Mount Holyoke College, **Jenny Yang**, Bard College at Simon's Rock, **Xiaocen Liu**, University of Michigan, **Minsoo Park**, Columbia University, **Samadrita Bhattacharya**, Indian Statistical Institute, Bangalore Centre, **Pouria Salekani**, California State University, Northridge and **Aseel Kmail**, Arab American University (1203-68-46603)

3:30PM *On the Geometry of a Fake Projective Plane with 21 Automorphisms*  
 ▶ ◆ (323.161) **Lev Borisov**, Rutgers, The State University of New Jersey, **Mattie Ji**<sup>\*</sup>, University of Pennsylvania, **Yanxin Li**, Rutgers, The State University of New Jersey and **Sargam Mondal**, MIT PRIMES-USA (1203-14-46608)

3:30PM *The Relevance of History in Mathematics Education: An Analysis Concerning the Relation of Teaching Math History and the Success Levels of Students in the Classroom*  
 ▶ (323.162) **Caden Scott Hildenbrand**<sup>\*</sup>, George Fox University, **Sarah Kerrigan**, George Fox University and **Corban Harwood**, George Fox University (1203-97-46609)

3:30PM *Graph Operations Preserving Flow Polytopes for Acyclic Directed Graphs*  
 ▶ ◆ (323.163) **Xavier Francisco Madrid**<sup>\*</sup>, University of California, Riverside, **Jana Fahs**<sup>\*</sup>, University of California, Riverside and **Jonathan Cervantes**,

University of California, Riverside (1203-05-46610)

3:30PM *Wavelet Based Analysis of the genetic architecture of Alzheimer's disease with tensor regression model*  
 ▶ (323.164) **Emma Chow**<sup>\*</sup>, Baycodingclub, **Ruby Zhao**<sup>\*</sup>, Baycodingclub, **Linqi Zhang**<sup>\*</sup>, Barcodingclub, **Michael Shen**<sup>\*</sup>, Bayodingclub, **Jiayu Su**<sup>\*</sup>, Baycodingclub and **Olivia Xu**<sup>\*</sup>, Baycodingclub (1203-92-46611)

3:30PM *LeAF: Leveraging Deep Learning for Agricultural Pest Detection and Classification for Farmers*  
 ▶ (323.165) **Aditya Sengupta**<sup>\*</sup>, The Overlake School (1203-68-46617)

3:30PM *Non-Stabilizing Parallel Chip-Firing Games*  
 ▶ (323.166) **Daniel Wang**<sup>\*</sup>, Lakeside School, **Michael Li**<sup>\*</sup>, University High School and **David Ji**<sup>\*</sup>, Montgomery High School (1203-05-39142)

3:30PM *Phase Transitions in Biased Random  $\mathbb{Z}^d$ -SAT*  
 ▶ (323.167) **Mithra Vamshi Karamchedu**<sup>\*</sup>, Harvey Mudd College, **Gülce Kardeş**, University of Colorado, Boulder, Santa Fe Institute and **Cristopher Moore**, Santa Fe Institute (1203-68-44809)

3:30PM *Topological Approaches to Convex Configurations and Intersection Problems*  
 ▶ (323.168) **Hongyi Zhang**<sup>\*</sup>, Haverford College and **Francesca Cantor**<sup>\*</sup>, Swarthmore College (1203-52-46584)

3:30PM *Sato-Tate Groups and Distributions of  $\sum_{\ell \leq x} \chi(\ell) \ell^{-1}$*   
 ▶ (323.169) **Rezwan Hoque**<sup>\*</sup>, Brooklyn College, City University of New York and **Heidi Goodson**, Brooklyn College, City University of New York (1203-11-41635)

3:30PM *Vertex functions of type D Nakajima quiver varieties*  
 ▶ (323.170) **Jiwu Jang**<sup>\*</sup>, MIT PRIMES-USA (1203-14-46631)

3:30PM *Predictability in Major Sports Leagues: Betting Market vs Model Based Predictions*  
 ▶ (323.171) **David Xia**<sup>\*</sup>, University of Illinois Urbana-Champaign (1203-62-46633)

**(324) SIAM Minisymposium on Reduced Order Models for Convection-Dominated Flows: Modeling, Analysis, and Simulation, II**

FRIDAY, JANUARY 10 3:30PM–5:30PM 2B, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Jorge Reyes**, Virginia Tech  
**Ping-Hsuan Tsai**, Virginia Tech  
**Traian Iliescu**, Virginia Tech

3:30PM *Parametric Model-Order-Reduction for Buoyancy-Driven Flows*  
 (324.1) **Paul Fischer**<sup>\*</sup>, University of Illinois, Urbana-Champaign, **Nick Christensen**, University of Illinois, Urbana-Champaign, **Viral Shah**, University of Illinois, Urbana-Champaign,

**Kento Kaneko**, M.I.T. and **Ping-Hsuan Tsai**, Virginia Tech (1203-35-45666)

4:00PM  
▶ (324.2) *Distributed computing for physics-based data-driven reduced modeling at scale*

**Ionut Farcas**<sup>\*</sup>, Virginia Tech, **Rayomand P. Gundevia**, Jacobs Engineering Group, Inc., **Ramakanth Munipalli**, Air Force Research Laboratory and **Karen Willcox**, The University of Texas at Austin (1203-65-44668)

4:30PM  
◆ (324.3) *A data-driven reduced order model for two-layer quasi-geostrophic oceans*

**Lander Besabe**<sup>\*</sup>, University of Houston, **Michele Girfoglio**, SISSA, **Annalisa Quaini**, University of Houston and **Gianluigi Rozza**, SISSA (1203-65-38652)

5:00PM  
▶ (324.4) *Reduced Order Modeling for the Optimization of Vascular Surgery*

**Imran Shah**, Department of Biomedical Engineering, Georgia Institute of Technology, Atlanta GA USA, Department of Mathematics, Emory University, Atlanta GA USA, **Ian Moore**, Virginia Tech, **Francesco Ballarin**, Department of Mathematics, Università Cattolica del Sacro Cuore, **Traian Iliescu**, Virginia Tech and **Alessandro Veneziani**<sup>\*</sup>, Department of Mathematics, Department of Computer Science, Emory University, Atlanta (GA) (1203-65-44492)

### ***SLMath (MSRI) Panel: ADJOINT: The First Five Years***

FRIDAY, JANUARY 10 3:30PM–5:00PM 611, Level Six,  
Seattle Convention Center Arch at  
705 Pike

The ADJOINT program provides opportunities for U.S. mathematicians, especially those from the African Diaspora, to form collaborations with African-American research leaders on topics at the forefront of mathematical and statistical research. ADJOINT began as a pilot in Summer 2019, and has continued every summer. This panel will focus on the first five years of ADJOINT and the future of our efforts to foster a community of African-Americans in the mathematical and statistical sciences.

Moderators: **Edray Herber Goins**, Pomona College

**Anisah Nabilah Nu'Man**, Spelman College

Organizers: **Anisah Nabilah Nu'Man**, Spelman College

**Edray Herber Goins**, Pomona College

Panelists: **Kwadwo Antwi-Fordjour**, Samford University

**Tepper L. Gill**, Howard University

**Julie Ivy**, University of Michigan

**Sherry Euvette Scott**, MSRI

### ***(325) AWM Workshop Poster Presentations***

FRIDAY, JANUARY 10 4:00PM–5:30PM Grand Ballroom  
Pre-Function Area, Second Floor,  
Sheraton Grand Seattle

Organizers: **Carolyn Abbott**, Brandeis University

**Sarah Reznikoff**, Kansas State University

**Rachel Skipper**, University of Utah

**Denise A Rangel Tracy**, Francis Marion University

**Maria Grazia Viola**, Lakehead University

**Matthew Krauel**, Sacramento State University

4:00PM  
▶ (325.1) *Double-box and double-dimer configurations*  
**Tatyana Benko**<sup>\*</sup>, University of Oregon (1203-05-38919)

4:00PM  
◆ (325.2) *Optimal control for coupled sweeping processes under minimal assumptions*  
**Samara S Chamoun**<sup>\*</sup>, Michigan State University and **Vera Zeidan**, Michigan State University (1203-49-38716)

4:00PM  
▶ ◆ (325.3) *On the distribution of first digits in the sequence of Markoff numbers*  
**Holli Chopra**<sup>\*</sup>, University of California, Davis (1203-11-44882)

4:00PM  
(325.4) *Network Resources: Towards a characterization of balanced vertex partitioned graphs*  
**Ann Wells Clifton**<sup>\*</sup>, Louisiana Tech University, **Galen Turner**, Louisiana Tech University and **Hays Whitlatch**, Gonzaga University (1203-05-44034)

4:00PM  
▶ (325.5) *Enhanced topological inference through higher dimensional mapper graphs.*  
**Halley Fritze**<sup>\*</sup>, University of Oregon (1203-62-44562)

4:00PM  
(325.6) *Compression Across Dimension: Matrix Storage and Structure via Tensor Approach*  
**Allison Fuller**<sup>\*</sup>, Arizona State University (1203-65-38975)

4:00PM  
(325.7) *Describing Units of the  $\mathbb{S}\mathbb{A}\mathbb{S}$ -Fibered Burnside Ring*  
**Jennifer Guerrero**<sup>\*</sup>, University of California, Santa Cruz (1203-20-38683)

4:00PM  
◆ (325.8) *Mathematical Foundations and Practical Applications in Scalable Time Series Classification*  
**Sanaz Hami Hassan Kiyadeh**<sup>\*</sup>, The University of Alabama, **Ramin Goudarzi Karim**, Stillman College and **Brendan Ames**, The University of Southampton (1203-62-42136)

4:00PM  
▶ (325.9)  *$\mathbb{S}k\mathbb{S}$ -regular embeddings and algebraic topology*  
**Evgeniya Lagoda**<sup>\*</sup>, Freie Universität Berlin (1203-55-42189)

4:00PM  
▶ (325.10) *FINITE ELEMENT ANALYSIS FOR SEMILINEAR PROBLEMS IN LIQUID CRYSTALS*  
**Ruma Rani Maity**<sup>\*</sup>, University of Innsbruck (1203-65-42052)

4:00PM  
▶ ◆ (325.11) *Finishing the chapter: computing the convex hull of the graph of a trilinear monomial over a general box domain*  
**Emily Speakman**, University of Colorado-Denver and **Lillian Makhoul**<sup>\*</sup>, University of Colorado Denver (1203-90-41915)

4:00PM  
▶ (325.12) *Tetrahedron-intersecting families of hypergraphs*

**Nitya Mani**, Massachusetts Institute of Technology and **Owen Zhang**, Independent (1203-05-41844)

- 4:00PM *Automorphic Differential Operators*  
◆ (325.13) **Marcella Manivel**, University of Minnesota (1203-11-42285)
- 4:00PM *Koszul Duality, but Make it Equivariant*  
◆ (325.14) **Sofia Rose Martinez Alberga**, Purdue University (1203-55-36951)
- 4:00PM *Oriented Matroid Circuit Polytopes*  
▶ (325.15) **Laura Escobar**, Washington University in St. Louis and **Jodi McWhirter**, Washington University in St. Louis (1203-52-42396)
- 4:00PM *Robustness of an Agent Based Model on Cardiac Action Potentials*  
▶ ◆ (325.16) **Bernette Chan**, California Polytechnic State University San Luis Obispo, **Mackenzi Mehlberg**, California Polytechnic State University San Luis Obispo and **Joyce Lin**, Cal Poly State University (1203-92-41973)
- 4:00PM *Neighbor-Sampling Based Momentum Stochastic Methods for Training Graph Neural Networks*  
▶ (325.17) **Molly Renee Noel**, Rensselaer Polytechnic Institute and **Yangyang Xu**, Rensselaer Polytechnic Institute (1203-90-42247)
- 4:00PM *Non-autonomous parabolic bifurcation on a class of  $M$ -obius transformations*  
▶ (325.18) **Samantha Sandberg-Clark**, The Ohio State University, **Liz Vivas**, The Ohio State University and **Katelynn Huneycutt**, The Ohio State University (1203-37-42739)
- 4:00PM *An a posteriori error field calculation of the finite element method*  
◆ (325.19) **Kimberly Savinon**, University of Connecticut and **Jeffrey M. Connors**, University of Connecticut (1203-65-38969)
- 4:00PM *Persistence Measures and Continuous Persistence Landscapes*  
▶ ◆ (325.20) **Wanchen Zhao**, University of Florida and **Peter Bubenik**, University of Florida (1203-55-41759)

**COMAP Workshop: Become a COMAP MCM/ICM Judge: Who, What, When, Where, & Why**

FRIDAY, JANUARY 10 4:00PM–5:00PM **Ravenna A, Third Floor, Sheraton Grand Seattle**

In this judge training workshop, members of COMAP's Mathematical Contest in Modeling (MCM) and Interdisciplinary Contest in Modeling (ICM) leadership teams will explain the judging process for the MCM and ICM contests. Participants will receive the information and training they need to sign up and be successful as a triage judge for the contests. Note: This session is not relevant to undergraduates or graduate students in their first two years of graduate study.

Organizers: **Keith Erickson**, Georgia Gwinnett College  
**Ben Galluzzo**, Consortium for Mathematics and Its Applications (COMAP)  
**Kayla Blyman**, St. Martin's University

**Kim A Kuda**, COMAP

**MAA Project NEXt: Beyond Lectures: Active Learning Implementation in Mathematics Courses**

FRIDAY, JANUARY 10 4:00PM–5:15PM **609, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Cherry Ng**, Northwestern University  
**Sarah Kerrigan**, George Fox University  
**Abu Thomas**, Tulane University  
**Hitesh Gakhar**, Michigan State University  
**Joshua P. Bowman**, Pepperdine University  
**Amy Ellis**, University of Georgia  
**Robert Ely**, University of Idaho  
**Kaitlyn Stephens Serbin**, The University of Texas Rio Grande Valley

**AMS DC-Based Policy & Communications Opportunities**

FRIDAY, JANUARY 10 4:30PM–5:30PM **4C-3, Level Four, Seattle Convention Center Arch at 705 Pike**

AMS Special Presentation on Washington, DC-based policy & communications opportunities, including the AMS Congressional Fellowship; the AMS Mass Media Fellowship; and the AMS Catalyzing Advocacy in Science and Engineering (CASE) Fellowship.

Organizers: **Karen Saxe**, American Mathematical Society  
**Mayleen Cortez-Rodriguez**, Cornell University  
**Ashwin Iyengar**, Johns Hopkins University  
**Max Springer**, University of Maryland, College Park  
**Jennifer Vaccaro**, AMS CASE Fellow 2024  
**Anita Benjamin**, American Mathematical Society

**(326) POMSIGMAA Guest Lecture - Thomas Drucker, University of Wisconsin-Whitewater**

FRIDAY, JANUARY 10 5:45PM–6:45PM **609, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Bonnie Gold, PhD**, Monmouth University  
**Steven M. Deckelman**, University of Wisconsin-Stout

5:45PM (326.1) *From Computing Machinery and Intelligence to Snake Oil*  
**Thomas L Drucker**, University of Wisconsin-Whitewater (1203-03-46110)

**Mathematically Bent Theater**

FRIDAY, JANUARY 10 6:00PM–7:00PM **Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike**

Why did the Bernoulli brothers switch from comedy to math? What's the funniest joke involving an asymptote? Do algebraists eat their PB & J sandwich with the peanut butter up or down? These are just a few of the questions we will

not answer during this theatrical presentation of several short humorous mathematically inclined pieces.

Organizer: **Colin Adams**, Williams College

***(327) NAM Cox-Talbot Lecture - Omayra Ortega, Sonoma State University***

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**FRIDAY, JANUARY 10 7:45PM–8:45PM Grand Ballroom C, Second Floor, Sheraton Grand Seattle**

Organizers: **Asamoah Nkwanta**, Morgan State University  
**Torina D. Lewis**, National Association of Mathematicians  
**Aris Winger**, Georgia Gwinnett College

7:45PM *Who is the Conscience of AI?*  
▶ (327.1) **Omayra Ortega**, Sonoma State University (1203-62-36490)

## Saturday, January 11

***Joint Meetings Registration***

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**SATURDAY, JANUARY 11 7:30AM–12:00PM Atrium Lobby, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizer: **AMS Meetings Department**, American Mathematical Society

***(328) AIM Special Session on Applications and Generalizations of Zero Forcing, I***

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**SATURDAY, JANUARY 11 8:00AM–12:00PM 3B, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Veronika Furst**, Fort Lewis College  
**Mary Flagg**, University of St. Thomas

8:00AM *TAR reconfiguration for vertex set parameters*  
(328.1) **Leslie Hogben**, American Institute of Mathematics, Iowa State U, Purdue U (1203-05-40843)

9:00AM *Fast and flexible computation of zero forcing parameters*  
▶ (328.2) **Louis Deaett**, Quinnipiac University and **Alexander Hutman**, Independent Researcher (1203-05-42847)

9:30AM *The Power Domination Toolbox*  
▶ (328.3) **Beth Bjorkman**, Air Force Research Laboratory and **Johnathan Koch**, Applied Research Solutions (1203-05-41674)

10:00AM *Graphs in which all maximal failed zero forcing sets are maximum*  
▶ (328.4) **Bonnie Catherine Jacob**, Rochester Institute of Technology (1203-05-42198)

10:30AM *Failed Zero Forcing TAR Graphs*  
(328.5) **Dennis Hall**, Angelo State University (1203-05-44646)

11:00AM *Throttling Number of Zero Forcing and Power Domination on Graphs*  
▶ (328.6) **Ryan Blair**, CSU Long Beach, **Veronika Furst**, Fort Lewis College, **Gabriel Elvin**, California

State University, San Bernardino, **Leslie Hogben**, American Institute of Mathematics, Iowa State U, Purdue U, **Nandita Sahajpal**, Nevada State University and **Tony Wing Hong Wong**, Kutztown University of Pennsylvania (1203-05-44061)

11:30AM *The state of the AIM IEPG-ZF Research Community*  
(328.7) **Mary Flagg**, University of St. Thomas (1203-05-42422)

***(329) AIM Special Session on Pedagogical Practices in Math Circles and Other Non-Traditional, Informal, and Recreational Math Spaces, I***

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**SATURDAY, JANUARY 11 8:00AM–12:00PM 3A, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Li-Mei Lim**, Boston University  
**Douglas O'Roark**, Math Circles of Chicago  
**Amber Verser**, Hampshire College Summer Studies in Mathematics

8:00AM *R2D2 (Remove-2-Draw-2) and the Power of Pairs: a Math Circle problem origin story*  
▶ (329.1) **Yue Lei**, University of California, Merced and **Changho Kim**, University of California, Merced (1203-101-42015)

8:30AM *How to grow an elementary-middle school math circle with diverse learners*  
▶ (329.2) **Nataliya Yufa**, Cambridge Math Circle (1203-101-42883)

9:00AM *Engagement is Key: Keeping Learner-Driven Inquiries Alive with Adaptive Plot Hooks and Focusing Questions*  
▶ (329.3) **Taylor Yeracaris**, Global Math Circle (1203-101-45250)

9:30AM *Magic Squares: Equipping Students and Anticipating Responses*  
(329.4) **Douglas O'Roark**, Math Circles of Chicago (1203-102-42856)

10:00AM *Break*

10:30AM *Culturally-responsive informal pedagogical practices: Striking the right balance*  
▶ (329.6) **Alessandra Pantano**, University of California, Irvine, **Andrés Forero**, University of California, Irvine, **Cynthia Sanchez-Tapia**, Cal State University, Dominguez Hills, **Taylor Michelle Wycoff**, University of California, Irvine and **Sandra Simpkins**, University of California, Irvine (1203-101-44836)

11:30AM *Lessons Learned from the Kaplans*  
▶ ♦ (329.7) **Rodi Steinig**, Math Renaissance (1203-101-43350)

***(330) AMS Contributed Paper Session on Computer Science***

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**SATURDAY, JANUARY 11 8:00AM–12:00PM 308, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

8:00AM  
▶ (330.1) *Advancing Time Series Classification with Integrated Machine Learning Approaches*  
**Sanaz Hami Hassan Kiyadeh**<sup>\*</sup>, The University of Alabama, **Ramin Goudarzi Karim**, Stillman College and **Brendan Ames**, The University of Southampton (1203-68-38876)

8:15AM  
▶ ◆ (330.2) *Bayesian Inference for Deep Learning*  
**Ricardo Reyna**<sup>\*</sup>, University of Texas Rio Grande Valley (1203-68-40173)

8:30AM  
▶ (330.3) *Can We See the Next Recession Coming? Deep Learning in Economic Forecasting.*  
**Binod Rimal**<sup>\*</sup>, The University of Tampa, **Ramchandra Rimal**, Middle Tennessee State University and **Hum Nath Bhandari**, Roger Williams University (1203-68-41055)

8:45AM  
▶ (330.4) *Neural Decoding in Primate Working Memory: Machine Learning and Deep Learning Approaches*  
**Changlan Chen**<sup>\*</sup>, New York University, **Jason Gerstenberger**, University of West Florida and **Shusen Pu**, University of West Florida (1203-68-42729)

9:00AM  
▶ (330.5) *Deep Learning for Enhanced Nuclei Segmentation with Generated Data in Histopathological Images*  
**Rajendra K C Khatri**<sup>\*</sup>, Philander Smith University (1203-68-43603)

9:15AM  
▶ ◆ (330.6) *Continuous Time Recurrent and Liquid Quantum Neural Networks*  
**Alejandro Antonio Mayorga**<sup>\*</sup>, Western Connecticut State University, **Alexander Yuan**, Western Connecticut State University, **Andrew Yuan**, Boston College, **Tyler Rust Wooldridge**, Western Connecticut State University and **Xiaodi Wang**, Western Connecticut State University (1203-68-43890)

9:30AM  
▶ (330.7) *Grammian Angular Difference Field-based Neural Ordinary Differential Equations for Time Series Data*  
**Hari Kishan Prakash**<sup>\*</sup>, UCSD, Roswell me inc and **Madhavi Prakash**, University of California Berkeley (1203-68-44841)

9:45AM  
▶ (330.8) *Automated Qualitative Thematic Analysis of Mental Health in Social Media Posts*  
**Surya Appana**<sup>\*</sup>, University of California, Berkeley, **Ikhoon Eom**, National University of Singapore and **Jia Jun Tan**, National University of Singapore (1203-68-43205)

10:00AM  
▶ (330.9) *A Hybrid Approach to Multi-Class Text Classification with Missing Labels*  
**William Trok**<sup>\*</sup>, University of Chicago (1203-68-45517)

10:15AM  
▶ ◆ (330.10) *CaLMPHosKAN: Prediction of General Phosphorylation Sites in Proteins via Fusion of Codon Aware Embeddings with Amino Acid Aware Embeddings and Wavelet-based Kolmogorov–Arnold Network*  
**Meenal Chaudhari**<sup>\*</sup>, Assistant Professor of Computer Science, Illinois State University,

**Pawel Pratyush**, PhD Candidate, Golisano College of Computing and Information Sciences, Rochester Institute of Technology, **Dukka KC**, Professor and Chair, Golisano College of Computing and Information Sciences, Rochester Institute of Technology, **Callen Carrier**, College of Computing, Michigan Technological University, Houghton MI, **Suresh Pokharel**, Golisano College of Computing and Information Sciences, Rochester Institute of Technology, Rocheste and **Hamid Ismail**, College of Engineering, North Carolina A&T State University, Greensboro NC (1203-68-45663)

10:30AM  
▶ ◆ (330.11) *Applications of CycleGANs to X-ray Diffraction Analysis*  
**Samantha J. Brozak**<sup>\*</sup>, Sandia National Laboratories, **Brendan Donohoe**, Sandia National Laboratories, **David Montes de Oca Zapiain**, Sandia National Laboratories and **J. Matthew D. Lane**, Sandia National Laboratories (1203-68-43251)

10:45AM  
▶ (330.12) *Optimizing over different data types using pysheaf (a Python Sheaf Library)*  
**Donna A Dietz**<sup>\*</sup>, American University and **Michael Robinson**, American University (1203-68-40653)

11:00AM  
▶ (330.13) *CryptoQuest - Interactive Animation Series for Teaching Cryptography, Post-Quantum Cryptography, and Cybersecurity Using Extended Reality*  
**Blain Patterson**<sup>\*</sup>, Virginia Military Institute, **Sarah Elizabeth Ritchey Patterson**, Virginia Military Institute and **Sherif Abdelhamid**, Virginia Military Institute (1203-68-44078)

11:15AM  
◆ (330.14) *Hyperbolic Distance Optimization Algorithm for Orbital Trajectories*  
**Pranav Kulkarni**<sup>\*</sup>, Stanford University and **Harmanjot Singh**, Independent Researcher (1203-68-40257)

11:30AM  
▶ ◆ (330.15) *AI Firefighter: A Physics Informed Decision-Making Neural Network for Optimized Firefighting on Arbitrary Landscapes*  
**Selma Hatice Emekci**<sup>\*</sup>, Pioneer High School (1203-35-39773)

11:45AM  
▶ (330.16) *Machine Learning Applications on Physiological Data for Performance Prediction*  
**Ramchandra Rimal**<sup>\*</sup>, Middle Tennessee State University and **Lala Yamazaki**, Middle Tennessee State University (1203-68-44007)

### **(331) AMS Contributed Paper Session on Functional Analysis and Operator Theory**

**SATURDAY, JANUARY 11 8:00AM–12:00PM 306, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

8:00AM  
(331.1) *A Linear Operator bounded in all Besov but not in Triebel-Lizorkin Spaces*  
**Liding Yao**<sup>\*</sup>, The Ohio State University (1203-46-44239)

- 8:15AM  
◆ (331.2) *Multiplier Algebras of  $SL^p$ -operator Algebras.*  
**Alonso Delfin Ares De Parga**<sup>\*</sup>, University of Colorado, Boulder, **Andrey Blinov**, Unaffiliated and **Ellen Weld**, Sam Houston State University (1203-46-42350)
- 8:30AM  
(331.3) *On the universal enveloping ternary ring of unbounded operators of a locally  $JB^*$ -triple system.*  
**Alexander A. Katz**<sup>\*</sup>, Department of Mathematics and Computer Science, St. John's College of LAS, St. John's University, NY (1203-46-36807)
- 8:45AM  
(331.4) *On Apostol Theorem for locally  $JB$ -algebras*  
**Oleg Friedman**<sup>\*</sup>, Lander College for Men/Touro University, NY and **Alexander A. Katz**, Department of Mathematics and Computer Science, St. John's College of LAS, St. John's University, NY (1203-46-45454)
- 9:00AM  
(331.5) *Eigenfunctions of Composition Operators on the Zygmund Space*  
**Bhupendra Paudyal**<sup>\*</sup>, Central State University (1203-47-43197)
- 9:15AM  
▶ (331.6) *Spectrum Shrinking Maps and Wigner Theorem*  
**Meaghan Allen**<sup>\*</sup>, University of New Hampshire (1203-46-44569)
- 9:30AM  
▶ (331.7) *The Topology of the Unitary Dual of Crystallography Groups*  
**Frankie Chan**<sup>\*</sup>, Davidson College and **Ellen Weld**, Sam Houston State University (1203-46-45321)
- 9:45AM  
▶ (331.8) *Flows of weights for real factors*  
**Sofya Sharipovna Masharipova**<sup>\*</sup>, University of Pittsburgh at Johnstown and **Shukhrat M Usmanov**, University of Pittsburgh at Johnstown (1203-46-44182)
- 10:00AM  
▶ ◆ (331.9) *On quasimonotone variational inequalities*  
**Oluwatosin Temitope Mewomo**<sup>\*</sup>, University of KwaZulu-Natal and **Victor Amarachi Uzor**, University of KwaZulu-Natal (1203-46-38848)
- 10:15AM  
▶ (331.10) *Extreme Subsets For Closure Operators*  
**Jay Kangel**<sup>\*</sup>, retired (1203-46-41698)
- 10:30AM  
(331.11) *Anti- $C^*$ -algebras*  
**Robert Pluta**<sup>\*</sup>, Northeastern University Oakland (1203-46-37697)
- 10:45AM  
(331.12) *H-Toeplitz operators on the Bergman space*  
**George R. Exner**<sup>\*</sup>, Bucknell University, **Chafiq Benhida**, University of Lille, France, **Ji Eun Lee**, Sejong University and **Jongrak Lee**, Sungkyunkwan University (1203-47-41091)
- 11:00AM  
(331.13) *Coupled Supersymmetry and the Fourier-Bessel Transform*  
**Cameron L. Williams**<sup>\*</sup>, Embry-Riddle Aeronautical University and **Jaxson G Mitchell**, Embry-Riddle Aeronautical University (1203-47-39321)

***(332) AMS Contributed Paper Session on Professional Development and Wider Issues, I***

**SATURDAY, JANUARY 11 8:00AM–12:00PM 302, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 8:00AM  
▶ (332.1) *From Principles to Practice: Ensuring Ethical AI Through Robust Standards and Scientific Integrity*  
**Rochelle Elaine Tractenberg**, Georgetown University and **Victor Piercey**<sup>\*</sup>, Ferris State University (1203-103-43771)
- 8:15AM  
▶ ◆ (332.2) *CANCELLED- A Case Study of Graduate Student Instructors' Mathematical Knowledge for Teaching*  
**Spirit M Karcher**<sup>\*</sup>, Florida State University (1203-103-42158)
- 8:30AM  
▶ (332.3) *Light the Undergraduate Research Flame: Starting a Math Research Camp at Your Institution*  
**William Johnston**<sup>\*</sup>, Butler University and **Jonathan Webster**, Butler University (1203-104-44481)
- 8:45AM  
▶ (332.4) *Calculating chords tension: the Favali Variants*  
**Federico Favali**<sup>\*</sup>, Conservatorio A. Vivaldi di Alessandria (1203-104-40271)
- 9:00AM  
▶ (332.5) *Wavelet and Statistical Analysis Based Study of Quality Control Charts*  
**Emily Kappel**<sup>\*</sup>, Western Connecticut State University (1203-104-45481)
- 9:15AM  
▶ (332.6) *From Class to Industry: Real-World Projects in Math, Statistics and Data Science*  
**Michele Joyner**<sup>\*</sup>, East Tennessee State University (1203-101-44309)
- 9:30AM  
▶ ◆ (332.7) *What's so 'inquiry' about this? Calculus instructors' perceptions of inquiry regarding instructional tasks*  
**Saba Gerami**<sup>\*</sup>, Cal Poly San Luis Obispo and **Aria Devries**, Cal Poly San Luis Obispo (1203-97-39054)
- 9:45AM  
▶ (332.8) *CANCELLED Strengthening the Math-to-Industry Pipeline at the University of Georgia*  
**Jennifer Royal**<sup>\*</sup>, University of Georgia (1203-103-44045)

***(333) AMS Special Session on Applications of Algebraic Geometry, I***

**SATURDAY, JANUARY 11 8:00AM–12:00PM 605, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Taylor Brysiewicz**, University of Western Ontario  
**Jessie Loucks-Tavitas**, University of Washington  
**Frank Sottile**, Texas A&M University  
**Timothy Duff**, Georgia Tech

- 8:00AM  
◆ (333.1) *CANCELLED Anti-Ramsey multiplicity*  
**Isabelle Shankar**<sup>\*</sup>, Portland State University (1203-05-43821)

8:30AM  
▶ ◆  
(333.2) *Tropicalization of the principal minors of positive definite matrices*  
**Abeer Al Ahmadi**<sup>\*</sup>, Georgia Institute of Technology, **Felipe Rincon**, Queen Mary University of London, **Cynthia L Vinzant**, University of Washington, Seattle and **Josephine Yu**, Georgia Institute of Technology (1203-14-44572)

9:00AM  
▶ (333.3) *Realizations of combinatorial incidence geometries*  
**Daniel Irving Bernstein**<sup>\*</sup>, Tulane University and **Signe Lundqvist**, Umea University (1203-52-43566)

9:30AM  
◆ (333.4) *Real Stability and Log Concavity are coNP-Hard*  
**Tracy Chin**<sup>\*</sup>, University of Washington (1203-68-43835)

10:00AM  
▶ (333.5) *Geographic-style maps of moduli spaces of rigid clouds of unordered points*  
**Vitaliy A Kurlin**<sup>\*</sup>, University of Liverpool (UK) (1203-14-41148)

10:30AM  
▶ (333.6) *Flatland Vision*  
**Rekha Rachel Thomas**<sup>\*</sup>, University of Washington, **Sameer Agarwal**, Google, **Erin Connelly**, University of Osnabrueck, **Annalisa Crannell**, Franklin & Marshall College and **Timothy Duff**, University of Missouri (1203-14-40085)

11:00AM  
▶ ◆  
(333.7) *Algebraic Geometry in Sequential Decision Making*  
**Ryan Anderson**, University of California, Los Angeles, **Johannes Müller**, RWTH Aachen and **Prof. Guido Francisco Montufar**<sup>\*</sup>, University of California, Los Angeles (1203-90-42608)

11:30AM  
▶ (333.8) *Activation thresholds and expressiveness of polynomial neural networks*  
**Thomas Yahl**<sup>\*</sup>, University of Wisconsin - Madison, **Jose Israel Rodriguez**, University of Wisconsin Madison, **Chenxi Wu**, University of Wisconsin At Madison and **Bella Finkel**, University of Wisconsin - Madison (1203-68-40289)

### ***(334) AMS Special Session on Applied and Computational Commutative Algebra, I***

**SATURDAY, JANUARY 11 8:00AM–12:00PM 607, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Branden Stone**, Georgia Tech Research Institute  
**Eloisa Grifo**, University of Nebraska-Lincoln

8:00AM  
(334.1) *Remarks on configuration polynomials*  
**Uli Walther**<sup>\*</sup>, Purdue University (1203-13-42657)

8:30AM  
◆ (334.2) *Finite Generation of Multigraded Regularity*  
**Juliette Emmy Bruce**<sup>\*</sup>, Dartmouth College (1203-13-39363)

9:00AM  
(334.3) *An investigation of the  $B\{ \{o\}r \} \{o\}czky$  configuration*  
**Shah Roshan Zamir**<sup>\*</sup>, University of Nebraska-Lincoln (1203-13-44301)

9:30AM  
▶ (334.4) *Exploring the Path Packing Polytope: Open Questions and Applications in Commutative Algebra*  
**Adam Laclair**<sup>\*</sup>, Purdue University (1203-13-44770)

10:00AM  
◆ (334.5) *Nonnegative Integer Rank of Matrices*  
**Amy Wiebe**<sup>\*</sup>, University of British Columbia Okanagan and **Joao Gouveia**, University of Coimbra (1203-15-42957)

10:30AM  
(334.6) *Cohomology of toric vector bundles and syzygies*  
**Michael Perlman**<sup>\*</sup>, University of Minnesota and **Gregory G. Smith**, Queen's University (1203-13-43552)

11:00AM  
(334.7) *Castelnuovo-Mumford Regularity of Toric Surfaces*  
**Sean Grate**<sup>\*</sup>, Auburn University (1203-14-45351)

11:30AM  
▶ (334.8) *How to distinguish non-toric structures?*  
**Aida Maraj**<sup>\*</sup>, Max Planck Institute CBG and **Arpan Pal**, University of Idaho (1203-13-43325)

### ***(335) AMS Special Session on Approximate Models of Fluid Motion, I***

**SATURDAY, JANUARY 11 8:00AM–12:00PM 310, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **John D Carter**, Seattle University  
**Anastassiya Semenova**, University of Washington

8:00AM  
▶ (335.1) *The Spatial Whitham Equation*  
**John D Carter**<sup>\*</sup>, Seattle University, **Diane Henderson**, Penn State University and **Panayotis Panayotaros**, Universidad Nacional Autónoma de México (1203-76-37696)

8:30AM  
▶ (335.2) *Comparisons Between NLS-Like Model Predictions and Experimental Measurements*  
**Joanna Van Liew**<sup>\*</sup>, Seattle University and **John D Carter**, Seattle University (1203-76-41657)

9:00AM  
(335.3) *What is the role of Wave-Mean Flow interactions in Frequency Downshifting?*  
**Daniel James Ratliff**<sup>\*</sup>, Northumbria University, **Thomas J. Bridges**, University of Surrey and **Olga Trichtchenko**, Western University (1203-76-40946)

9:30AM  
(335.4) *CANCELLED Nonlinear normal modes for water waves in a triangular domain*  
**Panayotis Panayotaros**<sup>\*</sup>, Universidad Nacional Autónoma de México (1203-35-41826)

10:00AM  
(335.5) *Whitham modulation theory for the Davey-Stewartson system*  
**Alexander Chernyavsky**<sup>\*</sup>, SUNY Buffalo and **Gino Biondini**, SUNY Buffalo (1203-35-42020)

10:30AM  
(335.6) *Modulation theory, dispersive shocks and stationary soliton gas for the Kadomtsev-Petviashvili equation*  
**Gino Biondini**<sup>\*</sup>, SUNY Buffalo (1203-35-43338)

11:00AM *The generalized Riemann problem for the Korteweg-De Vries equation and its applications*  
▶ (335.7) **Yifeng Mao**<sup>\*</sup>, Scripps Institution of Oceanography, **Gino Biondini**, SUNY Buffalo, **Gennady El**, Northumbria University and **Mark A Hoefler**, University of Colorado Boulder (1203-76-43312)

11:30AM *Initial-boundary value problems and the radiation condition for dispersive wave equations*  
▶ (335.8) **Mark A Hoefler**<sup>\*</sup>, University of Colorado Boulder, **Yifeng Mao**, Scripps Institution of Oceanography, University of California, San Diego and **Dionyssios Mantzavinos**, University of Kansas (1203-76-42863)

**(336) AMS Special Session on Artificial Intelligence Meets Computational Mathematics for Biological and Ecological Applications, I**

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SATURDAY, JANUARY 11 8:00AM-12:00PM 213, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Muhammad Mohebujjaman**, University of Alabama at Birmingham  
**Taufiqar R Khan**, University of North Carolina at Charlotte  
**Md Kamrujjaman**, University of Dhaka

8:00AM *Advancing nonlinear iterative solvers for Navier-Stokes equations through data-driven assimilation strategies*  
▶ (336.1) **Duygu Vargun**<sup>\*</sup>, Oak Ridge National Laboratory (1203-65-43993)

8:30AM *AI and Statistical Approaches for Electrical Impedance Tomography*  
▶ (336.2) **Taufiqar Khan**<sup>\*</sup>, University of North Carolina at Charlotte (1203-65-43181)

9:30AM *An efficient iterative method for solving the steady Navier-Stokes equations with large Reynolds numbers*  
(336.3) **Mengying Xiao**<sup>\*</sup>, University of West Florida (1203-65-40478)

10:00AM *Geometric graph-based deep learning model for drug design*  
▶ (336.4) **Md Masud Rana**<sup>\*</sup>, Kennesaw State University and **Duc Nguyen**, University of Tennessee, Knoxville (1203-92-44324)

10:30AM *Non-linearly coupled PDE based Stocking and Harvesting Models: Exploring Decoupled Algorithms and Analysis*  
▶ (336.5) **Muhammad Mohebujjaman**<sup>\*</sup>, University of Alabama at Birmingham, **Md. Kamrujjaman**, University of Dhaka, **Mayesha Sharmim Tisha**, University of Dhaka and **Taufiqar Khan**, University of North Carolina at Charlotte (1203-35-38903)

11:00AM *Personalized Colorectal Cancer Therapy: A Mathematical Model Integrating Immune Interactions and Patient-Specific Factors*  
▶ (336.6)

**Alvi Ahmed Sarker**<sup>\*</sup>, University of Dhaka and **Md Kamrujjaman**, University of Dhaka (1203-34-44394)

11:30AM *Mathematical Analysis and Deep Learning for Dengue Transmission Prevention and Control in a Tropical Environment: A Case Study of Bangladesh*  
▶ (336.7) **Md Kamrujjaman**<sup>\*</sup>, University of Dhaka, **Mahadee Al Mobin**, University of Dhaka and **Shaiful Islam Arafat**, University of Dhaka (1203-92-36734)

**(337) AMS Special Session on Combinatorial and Probabilistic Methods in Group Theory, I**

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SATURDAY, JANUARY 11 8:00AM-12:00PM Tahoma 2, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Gil Goffer**, University of California at San Diego  
**Tianyi Zheng**, University of California San Diego  
**Be"eri Greenfeld**, University of Washington

8:00AM *Measure equivalence of groups acting on negatively curved spaces*  
▶ (337.1) **Jingyin Huang**<sup>\*</sup>, Ohio State University and **Camille Horbez**, Laboratoire de Mathématiques d'Orsay (1203-20-43694)

9:00AM *Random quotients of hierarchically hyperbolic groups*  
(337.2) **Carolyn Abbott**<sup>\*</sup>, Brandeis University (1203-20-44778)

10:00AM *Frattini subgroups of hyperbolic-like groups*  
◆ (337.3) **Gil Goffer**, University of California at San Diego, **Denis V Osin**, Vanderbilt University and **Ekaterina Rybak**<sup>\*</sup>, Vanderbilt University (1203-20-40322)

10:30AM *Weak mixing of Markov measures on the boundary of free groups*  
(337.4) **Anush Tserunyan**, McGill University and **Jenna Zombak**<sup>\*</sup>, University of Maryland, College Park (1203-03-41472)

11:00AM *Random quotients of free products*  
(337.5) **Thomas Ng**<sup>\*</sup>, Brandeis University (1203-20-45234)

11:30AM *Poisson-Voronoi tessellations and fixed price in higher rank*  
(337.6) **Amanda Wilkens**<sup>\*</sup>, Carnegie Mellon University, **Mikolaj Fraczyk**, Jagiellonian University and **Sam Mellick**, Jagiellonian University (1203-37-41700)

**(338) AMS Special Session on Combinatorics and Graph Theory in Honor of Dr. Peter Johnson, I**

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SATURDAY, JANUARY 11 8:00AM-12:00PM Tahoma 4, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Fadekemi Janet Osaye**, Alabama State University  
**Michael Tait**, Villanova University

- Alex Somto Arinze Alochukwu**, DSI-NRF Centre of Excellence in Mathematical and Statistical Sciences, University of the Witwatersrand, Johannesburg  
**Paul Horn**, University of Denver  
**Overtoun Jenda**, Auburn University  
**Peter Dankelmann**, university of johannesburg  
**Katherine Perry**, Soka University of America  
**Adam Blumenthal**, Westminster College
- 8:00AM  
▶ ◆ (338.1) *Research Experiences for Undergraduates and the Masamu Program*  
**Overtoun Jenda**<sup>\*</sup>, Auburn University (1203-05-40016)
- 8:30AM  
▶ (338.2) *Proper Rainbow-Cycle-Forbidding Edge Colorings*  
**Dean Hoffman**, Auburn University, **Peter D. Johnson**, Auburn University, **Matt Noble**, Middle Georgia State University, **Andrew Owens**<sup>\*</sup>, Widener University, **Gregory J. Puleo**, Auburn University and **Nicholas Terry**, Penn State University (1203-05-41105)
- 9:00AM  
▶ ◆ (338.3) *Combinatorial Analysis of Pyramid, Ponzi, and MLM Schemes: Structural Instabilities and Disproportionate Impacts on People of Color*  
**Cadavious M Jones**<sup>\*</sup>, Rust College (1203-05-43581)
- 9:30AM  
▶ (338.4) *Some Recent Results for Edge-Regular Graphs with  $n=3\lambda + 3p - x$  vertices ( $x=4$  and  $x=6$ ) with Prescribed Induced Common Neighbor Set Structures of Adjacent Vertex Pairs*  
**Kenneth Joseph Roblee**<sup>\*</sup>, Troy University (1203-05-44596)
- 10:00AM  
*Break*
- 10:30AM  
▶ ◆ (338.6) *Representatives of special families*  
**Sarah H. Heuss**<sup>\*</sup>, USC - Union (1203-05-41787)
- 11:00AM  
▶ (338.7) *The characterization of all (2,4)-regular graphs*  
**Kelly Guest**<sup>\*</sup>, Tuskegee University (1203-05-43362)
- 11:30AM  
▶ (338.8) *Odd Vector Cycles and a Still Open Problem of Benda and Perles*  
**Gaston A. Brouwer**, Middle Georgia State University, **Jonathan Joe**, Middle Georgia State University and **Matt Noble**<sup>\*</sup>, Middle Georgia State University (1203-05-42143)

**(339) AMS Special Session on Cryptography and Related Fields, I**

SATURDAY, JANUARY 11 8:00AM–12:00PM Skagit 2, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Max Cartor**, University of Louisville  
**Angela Robinson**, NIST  
**Ryann Cartor**, Clemson University

- 8:00AM  
(339.1) *On the Spinor Genus and the Distinguishing Lattice Isomorphism Problem*  
**Andrew Mendelsohn**, Imperial College London, **Jingbo Liu**<sup>\*</sup>, Texas A&M University-San Antonio and **Cong Ling**, Imperial College London (1203-06-41147)
- 8:30AM  
▶ (339.2) *Faster Amortized FHEW bootstrapping using Ring Automorphisms*  
**Gabrielle De Micheli**<sup>\*</sup>, LG Electronics, UCSD (1203-68-40191)
- 9:00AM  
(339.3) *Leveled Homomorphic Encryption Schemes for Homomorphic Encryption Standard*  
**Kyle Yates**<sup>\*</sup>, Clemson University and **Shuhong Gao**, Clemson University (1203-94-44164)
- 9:30AM  
(339.4) *Masking Countermeasures Against Side-Channel Attacks on Quantum Computers*  
**Jason LeGrow**, Virginia Tech, **Travis Morrison**, Virginia Tech, **Jamie Sikora**, Virginia Tech and **Nicolas Swanson**<sup>\*</sup>, Virginia Tech (1203-94-40928)
- 10:00AM  
▶ (339.5) *Using Real Functions in Blockchain*  
**Teimuraz Tutberidze**<sup>\*</sup>, Ilia State University (1203-68-45245)
- 10:30AM  
▶ ◆ (339.6) *A Public-Key cryptosystem based on Matrices*  
**Henry Chimal-Dzul**<sup>\*</sup>, University of Texas at San Antonio (1203-94-44955)
- 11:00AM  
▶ (339.7) *The mathematics of RSA*  
**Nadia Heninger**<sup>\*</sup>, University of California, San Diego (1203-11-41962)

**(340) AMS Special Session on Current Directions on Modular Forms: in Twenty Minutes Snippets, II**

SATURDAY, JANUARY 11 8:00AM–11:30AM 606, Level Six, Seattle Convention Center Arch at 705 Pike

- Organizers: **Olivia Beckwith**, University of Illinois Urbana-Champaign  
**Kalani Thalagoda**, Tulane University  
**Victor H Moll**, Tulane University
- 8:00AM  
(340.1) *Half-integral weight modular forms with the eta-multiplier*  
**Scott Ahlgren**<sup>\*</sup>, University of Illinois at Urbana-Champaign (1203-11-41727)
- 8:30AM  
(340.2) *The Weil bound for generalized Kloosterman sums of half-integral weight*  
**Nickolas Robert Andersen**, Brigham Young University, **Gradin Anderson**, Brigham Young University and **Amy Woodall**<sup>\*</sup>, University of Illinois at Urbana-Champaign (1203-11-41434)
- 9:00AM  
(340.3) *Modular functions and the monstrous exponents*  
**John F. R. Duncan**, Academia Sinica and **Holly Swisher**<sup>\*</sup>, Oregon State University (1203-11-38979)
- 9:30AM  
(340.4) *Replicable functions arising from towers of codes, lattices and vertex operator algebras*  
**Lea Beneish**, University of North Texas, **Jennifer Berg**, Bucknell University, **Eva G.**

**Goedhart**, Franklin & Marshall College,  
**Hussain Kadhem**, University of California,  
Berkeley, **Allechar Serrano Lopez**, Montana  
State University and **Stephanie Treneer**,  
Western Washington University (1203-11-  
43772)

10:00AM  
▶ (340.5) *Modular Forms via Hypergeometric Functions*  
**Michael Allen**, Louisiana State University,  
**Brian Grove**, Louisiana State University, **Ling  
Long**, Louisiana State University and **Fang-  
Ting Tu**, Louisiana State University (1203-11-  
42742)

10:30AM  
(340.6) *An infinite family of hypergeometric  
supercongruences*  
**Michael Allen**, Louisiana State University,  
**Brian Grove**, Louisiana State University, **Ling  
Long**, Louisiana State University and **Fang-  
Ting Tu**, Louisiana State University (1203-33-  
43853)

11:00AM  
▶ (340.7) *A period function from the Lost Notebook of  
Ramanujan*  
**Rahul Kumar**, Penn State (1203-11-45370)

**(341) AMS Special Session on Ecological and  
Evolutionary Models in Biology and Epidemiology,  
I**

**SATURDAY, JANUARY 11 8:00AM–11:30AM Skagit 5, Lower  
Level, Seattle Convention Center  
Arch at 800 Pike**

Organizers: **Yun Kang**, Arizona State University

**Sabrina H Streipert**, University of Pittsburgh  
**Yanyu Xiao**, University of Cincinnati

8:00AM  
▶ (341.1) *Stoichiometry-dependent fear effect in a food  
chain model*  
**Tianxu Wang**, University of Alberta and **Hao  
Wang**, University of Alberta (1203-34-41568)

8:30AM  
▶ (341.2) *A New Discrete Two Species Competition Model  
with and without Delay*  
**Prof. Gail SK Wolkowicz, PhD**, McMaster  
University, **Sabrina Streipert**, University of  
Pittsburgh and **Bingyang Cui**, McMaster  
University (1203-39-43201)

9:00AM  
▶ ◆ (341.3) *Uncertainty quantification for ecological  
management*  
**Jody R Reimer**, University of Utah (1203-92-  
44736)

9:30AM  
(341.4) *Can the predator saturation effect cause  
periodic dynamics with non-overlapping age  
classes: an application of a Darwinian Leslie  
matrix model*  
**Jim Michael Cushing**, Department of  
Mathematics & Interdisciplinary Program in  
Applied Mathematics, University of Arizona  
(1203-92-42447)

10:00AM  
▶ (341.5) *CANCELLED Impact of actual and hypothetical  
COVID-19 vaccination strategies on  
symptomatic SARS-CoV-2 infections,  
hospitalizations, and deaths in the United  
States, 2020-23, Part I*

**Zhilan Feng**, National Science Foundation,  
**Troy Day**, Queen's University and **John W  
Glasser**, The US Centers for Disease Control  
and Prevention (1203-92-42236)

10:30AM  
(341.6) *Impact of actual and hypothetical COVID-19  
vaccination strategies on symptomatic SARS-  
CoV-2 infections, hospitalizations, and deaths  
in the United States, 2020-23, Part II*  
**Zhilan Feng**, National Science Foundation,  
**Troy Day**, Queen's University and **John W  
Glasser**, The US Centers for Disease Control  
and Prevention (1203-92-45594)

11:00AM  
▶ (341.7) *Applications of Target Reproduction Numbers  
in Epidemiology*  
**Zhisheng Shuai**, University of Central Florida  
(1203-92-45542)

**(342) AMS Special Session on Geometric and  
Topological Combinatorics, I**

**SATURDAY, JANUARY 11 8:00AM–12:00PM Tahoma 5, Level  
Three, Seattle Convention Center  
Arch at 800 Pike**

Organizers: **Gaku Liu**, University of Washington  
**Isabella Novik**, University of Washington  
**Bennet Goeckner**, University of Washington

8:00AM  
▶ (342.1) *The topology of chromatic numbers of  
hypergraphs*  
**Florian Frick**, Carnegie Mellon University  
(1203-05-41770)

9:00AM  
▶ ◆ (342.2) *Improving Tverberg's theorem for certain  
families of polytopes*  
**Pablo Soberón**, Baruch College, City University  
of New York and **Shira Zerbib**, Iowa State  
University (1203-52-41598)

9:30AM  
(342.3) *A generalization of Drisko's theorem*  
**Daniel A McGinnis**, Princeton University  
(1203-05-40344)

10:00AM  
◆ (342.4) *The Augmented External Activity Complex of a  
Matroid*  
**Dania Morales**, Willamette University (1203-  
05-43013)

10:30AM  
▶ (342.5) *Random Simple Homotopy Theory*  
**Bruno Benedetti**, University of Miami (1203-  
57-42818)

11:00AM  
(342.6) *Vietoris-Rips complexes of manifolds*  
**Henry Hugh Adams**, University of Florida  
(1203-55-39787)

**(343) AMS Special Session on Geometry and  
Machine Learning, I**

**SATURDAY, JANUARY 11 8:00AM–12:00PM 613, Level Six,  
Seattle Convention Center Arch at  
705 Pike**

Organizers: **Yang-Hui He**, City, University of London  
**Fabian Ruehle**, Northeastern University  
**Yaim Cooper**, University of Notre Dame  
**Tingting Tang**, San Diego State University

- 8:00AM  
▶ (343.1) *Mathematical Foundations of AI: learning compositionally sparse functions*  
**Tomaso Poggio**<sup>\*</sup>, MIT, CBMM (1203-68-45056)
- 9:00AM  
(343.2) *Harmonic  $S^1$ -forms on real loci of Calabi-Yau manifolds*  
**Michael R. Douglas**<sup>\*</sup>, Harvard / Stony Brook (1203-32-42246)
- 10:00AM  
▶ (343.3) *Regularized SGD Secretly Compresses Your Neural Network*  
**Tomer Galanti**<sup>\*</sup>, Texas A&M University (1203-68-44371)
- 11:00AM  
▶ ♦ (343.4) *A machine learning approach to resolution of singularities*  
**Gergely Berczi**<sup>\*</sup>, Aarhus University, **Honglu Fan**, University of Geneva and **Mingcong Zeng**, Aarhus University (1203-14-45271)

***(344) AMS Special Session on History of Mathematics, II***

**SATURDAY, JANUARY 11 8:00AM–12:00PM 608, Level Six, Seattle Convention Center Arch at 705 Pike**

- Organizers: **Deborah Kent**, University of St. Andrews  
**Elizabeth Hunter**, University of Chicago  
**Sloan Evans Despeaux**, Western Carolina University  
**Victor J. Katz**, University of Washington
- 8:00AM  
▶ (344.1) *An Anatomical Abacus: Finger Computus in Beda and Rhabdas, and its Gray-code Features*  
**Paul T Keyser**<sup>\*</sup>, Columbia Seminar on Classical Civilization (1203-01-41095)
- 8:30AM  
▶ (344.2) *Computational Procedures as Courtly Performances: Contextualizing Late Medieval Canons to Astronomical Tables*  
**Nicholas Andrew Jacobson**<sup>\*</sup>, University of Wisconsin-Madison (1203-01-41188)
- 9:00AM  
▶ ♦ (344.3) *Searching for an Equation for the Cycloid*  
**Maria R Zack**<sup>\*</sup>, Point Loma Nazarene University (1203-01-41992)
- 9:30AM  
▶ (344.4) *Taking it Public: Euler raises the stakes in the dispute over the perfect telescope*  
**Dominic Klyve**<sup>\*</sup>, Central Washington University (1203-01-42842)
- 10:00AM  
▶ (344.5) *The Evolution of the Derived Function Concept*  
**Robert E. Bradley**<sup>\*</sup>, Adelphi University (1203-01-43369)
- 10:30AM  
▶ (344.6) *An Introduction to Sir Edward Sabine through his Correspondence with Sir George Gabriel Stokes*  
**Brenda Davison**<sup>\*</sup>, SFU (1203-01-41521)
- 11:00AM  
▶ (344.7) *Francis Edgeworth and the Application of Calculus of Variations in Social Science*  
**Craig G. Fraser**<sup>\*</sup>, University of Toronto (1203-01-39262)

- 11:30AM  
▶ (344.8) *The broken stick problem*  
**James J. Tattersall**<sup>\*</sup>, Providence College and **Shawn L. McMurrin**, CSU San Bernardino (1203-01-39173)

***(345) AMS Special Session on Homotopy Theory, II***

**SATURDAY, JANUARY 11 8:00AM–12:00PM 617, Level Six, Seattle Convention Center Arch at 705 Pike**

- Organizers: **Morgan Peck Opie**, UCLA  
**Piotr Pstragowski**, Harvard University  
**Kirsten Wickelgren**, Duke University  
**XiaoLin Danny Shi**, University of Washington
- 8:00AM  
▶ (345.1) *Equivariant formal group laws and Quillen theorem*  
**Yunze Lu**<sup>\*</sup>, University of California, San Diego and **Igor Kriz**, University of Michigan (1203-55-43990)

- 8:30AM  
(345.2) *Equivariant monodromy and moduli*  
**Sidhanth Raman**<sup>\*</sup>, University of California, Irvine and **Thomas Brazelton**, Harvard University (1203-55-43289)
- 9:00AM  
(345.3) *Homology of generalized Hurwitz spaces via Fox-Neuwirth cells*  
**Anh Trong Nam Hoang**<sup>\*</sup>, University of Minnesota (1203-55-45487)
- 9:30AM  
(345.4) *Corepresentational functor calculi*  
**Kaya Arro**<sup>\*</sup>, University of California, Riverside (1203-18-43938)
- 10:00AM  
(345.5) *Involutions and the Brauer group in derived algebraic geometry*  
**Lucy Yang**<sup>\*</sup>, Columbia University, **Noah Rikkenbach**, Northwestern University and **Viktor Burghardt**, University of Michigan (1203-55-45500)
- 10:30AM  
(345.6) *Nil K groups and a question of Bass*  
**Noah Rikkenbach**<sup>\*</sup>, Northwestern University and **Elden Elmanto**, University of Toronto (1203-19-44207)
- 11:00AM  
♦ (345.7) *On the Computability of Immersions*  
**Helen Epelbaum**<sup>\*</sup>, University of California, Santa Barbara (1203-55-43330)
- 11:30AM  
(345.8) *On the Image of the Total Power Operation for Burnside Rings*  
**Nathan Cornelius**<sup>\*</sup>, University of Kentucky, **Nat Stapleton**, University of Kentucky, **David Mehrle**, University of Kentucky, **Lewis Dominguez**, University of Kentucky, **Millie Rose**, University of Kentucky and **Lakshay Modi**, University of Kentucky (1203-18-45543)

***(346) AMS Special Session on L-functions, Automorphic Forms, and Their Applications, I***

**SATURDAY, JANUARY 11 8:00AM–12:00PM 604, Level Six, Seattle Convention Center Arch at 705 Pike**

- Organizers: **Riad Masri**, Texas A&M University  
**Sheng-Chi Liu**, Washington State University

- 8:00AM (346.1) *Central L-values of the cuspidal Asai lifts*  
**Wenzhi Luo**<sup>\*</sup>, The Ohio State University (1203-11-40004)
- 9:00AM (346.2) *Upper Bounds for the Lowest First Zero in Families of Cuspidal Newforms*  
**Steven Joel Miller**<sup>\*</sup>, Williams College (1203-11-42610)
- 10:00AM (346.3) *Quartic Gauss sums over primes and metaplectic theta functions*  
**Alexander Dunn**<sup>\*</sup>, Georgia Institute of Technology (1203-11-41730)
- 11:00AM (346.4) *Lucas congruences using modular forms*  
**Frits Beukers**, Utrecht University, **Wei-Lun Tsai**<sup>\*</sup>, University of South Carolina and **Dongxi Ye**, Sun Yat-sen University (1203-11-42687)

**(347) AMS Special Session on Local-to-Global in Apollonian Circle Packings and Beyond, I**

SATURDAY, JANUARY 11 8:00AM–12:00PM 618, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Katherine E. Stange**, University of Colorado, Boulder  
**Catherine Maria Hsu**, Swarthmore College  
**Summer Haag**, University of Colorado, Boulder  
**Elena Fuchs**, UC Davis

- 8:00AM (347.1) *Spectral decomposition and Siegel-Veech transforms for strata: The case of marked tori*  
**Jayadev S. Athreya**<sup>\*</sup>, University of Washington (1203-32-38939)
- 9:00AM (347.2) *Prime Problems in Apollonian Circle Packings*  
**Sneha Chaubey**<sup>\*</sup>, IIT-Delhi (1203-11-44400)
- 9:30AM (347.3) *Local obstructions in prime components of Apollonian circle packings*  
**Elena Fuchs**, UC Davis, **Holley Friedlander**<sup>\*</sup>, Dickinson College, **Piper Harris**, **Catherine Maria Hsu**, Swarthmore College, **James Rickards**, University of Colorado, Boulder, **Katherine Sanden**, **Damaris Schindler**, Goettingen University and **Katherine E. Stange**, University of Colorado, Boulder (1203-11-43409)
- 10:00AM (347.4) *Prime components in Apollonian circle packings*  
**Damaris Schindler**<sup>\*</sup>, Goettingen University (1203-11-40040)
- 10:30AM (347.5) *Some perspectives on Local-Global problems*  
**Alex Kontorovich**<sup>\*</sup>, Rutgers University (1203-11-42314)
- 11:00AM (347.6) *The Local-Global Conjecture for Generalizations of Apollonian Circle Packings is Also False*  
**Wenyuan Shi**, Swarthmore College, **Hanqi Shi**, Swarthmore College, **Ian Whitehead**<sup>\*</sup>, Swarthmore College, **Ham Williams-Tracy**, Swarthmore College and **Jeffrey Zhirui Zhang**, Swarthmore College (1203-52-44574)

- 11:30AM (347.7) *On the local-global conjecture for higher-dimensional Kleinian sphere packings*  
**Edna Jones**<sup>\*</sup>, Tulane University (1203-11-43162)

**(348) AMS Special Session on Mathematical Quantum Chaos, III**

SATURDAY, JANUARY 11 8:00AM–12:00PM 612, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Semyon Dyatlov**, Massachusetts Institute of Technology  
**Maciej Zworski**, University of California, Berkeley

- 8:00AM (348.1) *bulk-edge correspondence of topological insulators with curved interface*  
**Xiaowen Zhu**<sup>\*</sup>, University of Washington and **Alexis Drouot**, University of Washington (1203-81-42012)
- 9:00AM (348.2) *Mathematical results on topological insulators*  
**Alexis Drouot**<sup>\*</sup>, University of Washington (1203-81-41001)
- 10:00AM (348.3) *How Dynamical Quantum Memories Forget*  
**Lukasz Fidkowski**<sup>\*</sup>, University of Washington (1203-81-44720)
- 11:00AM (348.4) *Propagation bounds for quantum many-body dynamics*  
**Bruno Nachtergaele**<sup>\*</sup>, University of California, Davis (1203-82-43459)

**(349) AMS Special Session on New Directions in Harmonic Analysis, I**

SATURDAY, JANUARY 11 8:00AM–12:00PM 304, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Andrew Walton Green**, Washington University In St. Louis  
**Brandon Sweeting**, University of Cincinnati  
**Nathan A. Wagner**, Brown University  
**Cody B. Stockdale**, Clemson University

- 8:00AM (349.1) *Endpoint weak-type mapping properties of the Bergman projection on non-smooth domains*  
**Adam Christopherson**<sup>\*</sup>, Baylor University (1203-32-38897)
- 8:30AM (349.2) *On Compactness of Products of Toeplitz Operators*  
**Trieu Le**, The University of Toledo, **Tomas Miguel P Rodriguez**<sup>\*</sup>, Kenyon College and **Sönmez Şahutoğlu**, The University of Toledo (1203-47-42341)
- 9:00AM (349.3) *The operator Laplacian on the Fock space*  
**Vishwa Dewage**<sup>\*</sup>, Clemson University and **Mishko Mitkovski**, Clemson University (1203-47-40760)
- 9:30AM (349.4) *On Some Properties of a Class of Radial Toeplitz Operators*  
**Trevor Camper**<sup>\*</sup>, Clemson University (1203-47-42728)

10:00AM *On Uniqueness for Half-Wave Maps with Hyperbolic target in Dimension  $d \geq 3$*   
▶ ◆ (349.5) **Silvino Reyes Farina**<sup>\*</sup>, University of Pittsburgh (1203-35-43291)

10:30AM *Probabilistic well-posedness for the cubic nonlinear Schrödinger equation using multilinear expansions and directional norms*  
▶ (349.6) **Gennady Uraltsev**<sup>\*</sup>, University of Arkansas (1203-35-45143)

11:00AM *Pseudo-Riesz bases.*  
◆ (349.7) **Deborpita Biswas**<sup>\*</sup>, Clemson University (1203-43-42359)

11:30AM *Note about non-compact embeddings between Besov spaces*  
▶ (349.8) **Chian Yeong Chuah**, The Ohio State University, **Jan Lang**, The Ohio State University and **Liding Yao**<sup>\*</sup>, The Ohio State University (1203-46-39681)

**(350) AMS Special Session on Operators in Inverse Problems, Differential Equations, and Machine Learning, I**

SATURDAY, JANUARY 11 8:00AM–12:00PM 201, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Hyun-Kyoung Kwon**, University of Albany SUNY

**Mikyong Lim**, Korea Advanced Institute of Science and Technology

**Doosung Choi**, Louisiana State University

8:00AM *Discriminative Sampling and Active Learning for Model Discovery Using Information Theory*  
(350.1) **Yuxuan Bao**<sup>\*</sup>, University of Washington, **Urban Fasel**, Imperial College London and **J Nathan Kutz**, University of Washington (1203-34-42069)

8:30AM *Two-level overlapping additive Schwarz preconditioner for training scientific machine learning applications*  
(350.2) **Youngkyu Lee**<sup>\*</sup>, Brown University (1203-68-40418)

9:00AM *A Data-Assisted Two-Stage Method for the Inverse Random Source Problem*  
▶ (350.3) **Ying Liang**<sup>\*</sup>, Duke University, **Peijun Li**, Purdue University and **Yuliang Wang**, Beijing Normal University (1203-35-42371)

9:30AM *Calderón problem for fractional Schrödinger operators on closed Riemannian manifolds*  
(350.4) **Katya Krupchyk**<sup>\*</sup>, UC Irvine (1203-35-45042)

10:00AM *Finiteness of Non-Scattering Wavenumbers*  
▶ (350.5) **Jingni Xiao**<sup>\*</sup>, Drexel University and **Michael Vogelius**, Rutgers University (1203-35-38910)

10:30AM *Data Valuation: Shapley Value and Beyond*  
▶ (350.6) **Yongchan Kwon**<sup>\*</sup>, Columbia University (1203-62-40752)

11:00AM *Conditional Sampling via Sore Based Diffusion.*  
(350.7) **Knut Solna**<sup>\*</sup>, UC Irvine, **Lorenzo Baldassari**, University of Basel, **Ali Siahkoobi**, Rice

University, **Josselin Garnier**, Ecole Polytechnique, France and **Maarten de Hoop**, Rice University (1203-60-41861)

11:30AM *Efficient quantum Gibbs samplers*  
▶ (350.8) **Bowen Li**<sup>\*</sup>, City University of Hong Kong (1203-81-40743)

**(351) AMS Special Session on Quaternions, I**

SATURDAY, JANUARY 11 8:00AM–12:00PM 602, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Johannes Familton**, Borough of Manhattan Community College

**Dr. Terrence Richard Blackman, BSc, MPhil, PhD**, Medgar Evers College (Chair)

**Chris McCarthy**, BMCC, City University of New York

8:00AM *The Brauer Dimension of a Field*  
◆ (351.1) **Shilpi Mandal**<sup>\*</sup>, Emory University (1203-16-41271)

8:30AM *An application to quaternions,  $q$ -Stirling numbers*  
(351.2) **Amrita Acharyya**<sup>\*</sup>, University of Toledo (1203-16-40629)

9:00AM *Fibered Module and Module with Continuous Basis*  
▶ (351.3) **Aleksandr Kleyn**<sup>\*</sup>, AMS (1203-16-40512)

9:30AM *Noncommutative Mordell–Lang problems*  
▶ ◆ (351.4) **Yifeng Huang**<sup>\*</sup>, University of Southern California, **Dragos Ghioca**, University of British Columbia and **Jason P Bell**, University of Waterloo (1203-11-42598)

10:00AM *Rational torsion points on abelian surfaces with quaternion multiplication*  
(351.5) **Jef Laga**, University of Cambridge, **Ciaran Schembri**, Dartmouth College, **Ari Shnidman**, Hebrew University and **John M. Voight**<sup>\*</sup>, Dartmouth College, University of Sydney (1203-11-41047)

10:30AM *Dihedralizing the quaternions, and other fun visual algebra constructions*  
▶ (351.6) **Matthew Macauley**<sup>\*</sup>, Clemson University (1203-20-42073)

11:00AM *A quaternion proof of a theorem about transversals in a spherical triangle*  
▶ (351.7) **Marshall A. Whittlesey**<sup>\*</sup>, California State University San Marcos (1203-51-40689)

11:30AM *Scaled global operators and Fueter variables on non-zero scaled hypercomplex numbers*  
▶ (351.8) **Daniel Alpay**<sup>\*</sup>, Chapman University (1203-30-40751)

**(352) AMS Special Session on Recent Developments in PDEs and Related Areas, I**

SATURDAY, JANUARY 11 8:00AM–12:00PM 303, Level Three, Seattle Convention Center Arch at 705 Pike

Organizers: **Zongyuan Li**, City University of Hong Kong

**Xueying Yu**, Oregon State University  
**Zhiyuan Zhang**, Northeastern University  
**Weinan Wang**, University of Oklahoma

- 8:00AM  
▶ (352.1) *On the planar triple junction problem for the Allen-Cahn system*  
**Zhiyuan Geng\***, Purdue University (1203-35-37345)
- 8:30AM  
(352.2) *An Alternative Inf-sup Approach to Solving Certain Coupled FSI Systems*  
**Pelin Guven Geredeli\***, Clemson University (1203-35-39678)
- 9:00AM  
(352.3) *Nonlocal approximation of optimal transport and diffusion*  
**Katy Craig\***, University of California, Santa Barbara (1203-35-40818)
- 9:30AM  
(352.4) *The Neumann Problem for the bi-Laplacian in Infinite Sectors*  
**Jeongsu Kyeong\***, Syracuse University, **Irina Mitrea**, Temple University and **Katharine A. Ott**, Bates College (1203-35-41593)
- 10:00AM  
(352.5) *Global well-posedness and scattering for the defocusing septic one-dimensional NLS via new smoothing and almost Morawetz estimates*  
**Zachary Lee\***, The University of Texas at Austin and **Xueying Yu**, Oregon State University (1203-35-41645)
- 10:30AM  
(352.6) *Optimal Path Planning in the Hamilton-Jacobi Formulation*  
**Christian Parkinson\***, Michigan State University (1203-35-42464)
- 11:00AM  
▶ (352.7) *Minmax rates for manifold learning: PDE methods for a problem in statistics*  
**Raghav Venkatraman\***, University of Utah (1203-35-42680)
- 11:30AM  
(352.8) *Pointwise decay for radial solutions of the Schrödinger equation with a repulsive Coulomb potential*  
**Jiahua Zou\***, Rutgers University (1203-35-42833)

**(353) AMS Special Session on Take the i Road: Welcoming Complex Numbers and Viewpoints Across the Undergraduate Curriculum, I**

**SATURDAY, JANUARY 11 8:00AM–12:00PM Chelan 2, Level 2, Seattle Convention Center Arch at 800 Pike**

Organizers: **Bob Sachs**, George Mason University  
**Paul Zorn**, St Olaf College

- 8:00AM *Introductory Remarks*
- 8:30AM  
▶ (353.2) *Zeros of complex-valued harmonic polynomials in Calculus I*  
**Michael Dorff\***, Brigham Young University (1203-101-41522)
- 9:00AM  
▶ (353.3) *An artful introduction to  $\mathbb{C}$  using ruler and compass*  
**Fred B. Holt\***, independent (1203-97-41911)

- 9:30AM  
▶ (353.4) *Visualizing complex two-dimensional vectors*  
**Paul Herstedt\***, Macalester College (1203-97-44273)
- 10:00AM  
▶ (353.5) *The Impact of Emphasizing Geometry and Visualization on Understanding Complex Analysis*  
**Mehmet Celik\***, Texas A&M University-Commerce and **Rebecca Dibbs**, Texas A&M University-Commerce (1203-97-44281)
- 10:30AM  
▶ (353.6) *Transformation-based Geometry Through Complex Numbers*  
**Helmut Knaust\***, The University of Texas at El Paso (1203-101-44479)
- 11:00AM  
▶ (353.7) *Calculus with numbers real and imaginary: adding the complex (numbers) to calculus 2*  
**Michael A Jackson\***, Grove City College (1203-97-44703)
- 11:30AM  
▶ (353.8) *Riddles and Folklores in the Complex Wonderland*  
**Wang-Hung Tse\***, Trinity Western University (1203-30-45441)

**(354) AMS Special Session on The Convergence of AI, Math, and Statistics in Biomedical Research, I**

**SATURDAY, JANUARY 11 8:00AM–12:00PM Skagit 4, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **Keisha Cook**, Tulane University  
**Fnu Nisha**, Clemson University  
**Baris Coskunuzer**, UT Dallas  
**Stanca Ciupe**, Virginia Tech  
**Akash ROY**, Medical University of South Carolina  
**Amanda Alexander**, University of Houston  
**Brighton Nuwagira**, University of Texas at Dallas  
**Sandra Annie Tsiorintsoa**, Clemson University  
**Seoyun Choe**, University of Central Florida  
**Arnaja Mitra**, The University of Texas at Dallas, Mathematics Department

- 8:00AM  
▶ (354.1) *Bayesian Experimental Design for Head Imaging by Electrical Impedance Tomography*  
**Ruma Rani Maity\***, University of Innsbruck (1203-65-40761)
- 8:30AM  
▶ (354.2) *Histopathological Cancer Detection with Topological Signatures*  
**Baris Coskunuzer\***, UT Dallas (1203-92-39526)
- 9:30AM  
▶ ♦ (354.3) *Topo-CNN: Breast Cancer Detection with Topological Deep Learning*  
**Brighton Nuwagira\***, University of Texas at Dallas, **Li Qiwei**, University of Texas at Dallas and **Baris Coskunuzer**, UT Dallas (1203-92-39099)
- 10:00AM  
▶ ♦ (354.4) *Using Different Approaches to Causal Inference to Assess the Effect of Ozone Exposure on DNA Methylation*

**Daniel Alfonso-Travieso\***, University of Central Florida (1203-62-40998)

10:30AM *A Nonparametric Method for estimating Kendall's tau for Time to Event Endpoints*  
▶ ◆ (354.5) **Akash ROY\***, Medical University of South Carolina (1203-62-41248)

11:30AM *Drugs should beware of duplicates and chameleons in the Protein Data Bank*  
▶ (354.6) **Vitaliy A Kurlin\***, University of Liverpool (UK) (1203-92-45085)

**(355) AMS Special Session on Using 3D-Printed and Other Digitally-Fabricated Objects in the Mathematics Classroom, I**

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SATURDAY, JANUARY 11 8:00AM–11:30AM Chelan 4, Level 2, Seattle Convention Center Arch at 800 Pike

Organizers: **Paul E. Seeburger**, Monroe Community College  
**Shelby Stanhope**, U.S. Air Force Academy

8:00AM *Incorporating 3D-printed models to solidify student understanding of triple integrals.*  
▶ (355.1) **Nathan Willis\***, University of California, Merced (1203-101-45648)

8:30AM *The impact of incorporating the Raising Calculus to the Surface inquiry materials on instructors*  
▶ (355.2) **Aaron D Wangberg\***, Winona State University, **Tisha Hooks**, Winona State University, **Jason Samuels**, BMCC/CUNY and **Brian Fisher**, Lubbock Christian University (1203-101-45109)

9:00AM *Reflections on Three Years of Manipulative Calculus*  
▶ (355.3) **David Mehrle\***, University of Kentucky (1203-101-41965)

9:30AM *Learning Activities using 3D-Printed Models to Explore Volumes of Revolution & Partial Derivatives*  
▶ (355.4) **Paul E. Seeburger\***, Monroe Community College and **Shelby Stanhope**, U.S. Air Force Academy (1203-97-43748)

10:30AM *Leveraging 3D printed models in conjunction with CalcPlot3D computer visualization for multivariable calculus instruction*  
▶ (355.5) **Shelby Stanhope\***, U.S. Air Force Academy, **Paul E. Seeburger**, Monroe Community College, **Stepan Paul**, North Carolina State University and **Deborah Moore-Russo**, University of Oklahoma (1203-101-41669)

**(356) AMS-ASA-SIAM Special Session on Mathematics of Deep Learning: A High-Dimensional Probability Perspective, I**

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SATURDAY, JANUARY 11 8:00AM–12:00PM Yakima 2, Level 1, Seattle Convention Center Arch at 800 Pike

Organizers: **Denny Wu**, New York University  
**Ioana Dumitriu**, University of California San Diego

**Tony Chiang**, Pacific Northwest National Lab  
**Zhichao Wang**, University of California San Diego

8:00AM *Introductory Remarks*

9:00AM *Differentially Private Algorithms for Synthetic Data*  
▶ (356.2) **Yiyun He\***, UCI, **Roman Vershynin**, UCI and **Yizhe Zhu**, USC (1203-60-44851)

10:00AM *On inherent limitations of GPT/LLM (logical view)*  
(356.3) **Serge Berger\***, AIDIL (1203-03-37812)

**(357) AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, III**

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SATURDAY, JANUARY 11 8:00AM–12:00PM Skagit 1, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Mark Daniel Ward**, Purdue University  
**Patricia Cahn**, Smith College  
**Khang Duc Tran**, California State University Fresno  
**Darren A. Narayan**, Claremont McKenna College

8:00AM *Pullback Parking Functions*  
▶ (357.1) **Pamela Estephania Harris**, Williams College, **Jennifer Elizabeth Elder**, Missouri Western State University, **Lucy Martinez**, Rutgers University, **Ilana Lavene**, University of Delaware, **Molly Oldham\***, University of Delaware and **Lybitina Koene**, Virginia Tech (1203-05-41205)

8:30AM *Puerto Rico Bird Call Classification Analysis using Neural Network Techniques*  
▶ (357.2) **Mario Alberto Hernandez\***, Universidad de Puerto Rico, Rio Piedras and **Miguel Lopez**, Virginia Tech (1203-68-42398)

9:00AM *An Odd Covering System of the Perfect Powers*  
▶ (357.3) **Chris Bispels**, University of Maryland, Baltimore County, **Matthew Cohen**, Carnegie Mellon University, **Joshua Harrington**, Cedar Crest College, **Joshua Lowrance\***, Biola University, **Kaelyn Pontes**, Hastings College, **Leif Erik Schaumann**, Kenyon College, Department of Mathematics and **Tony Wong**, Kutztown University of Pennsylvania (1203-11-44076)

9:30AM *Classification of Flow Polytopes via their Moduli Interpretation*  
▶ ◆ (357.4) **Xavier Francisco Madrid\***, University of California, Riverside, **Jonathan Cervantes**, University of California, Riverside and **Jana Fahs**, University of California, Riverside (1203-05-43213)

10:00AM *Hearing Cyclicity from the Spectrum of the Kohn Laplacian on Sphere Quotients*  
▶ (357.5) **Daniel Rodriguez\***, Texas A&M University, **Martha Rose Wolf**, University of Michigan and

**Yunus E. Zeytuncu**, University of Michigan-Dearborn (1203-32-44053)

10:30AM *The Interpolation Problem for Discrete Analytic Polynomials*  
▶ (357.6)

**Angel Fuerte-Perez**, Kansas State University, **Xavier Francisco Madrid**, University of California, Riverside, **Seth Pua**, University of Kansas, **Dan Volok**, Kansas State University, **Alex Yang**, Georgia Institute of Technology and **Steven Patrick Zanetti**, University of Michigan-Ann Arbor (1203-30-44210)

11:00AM *A Generalization of Euler's Identity and Accompanying Beck-Type Companion Identity*  
▶ (357.7)

**Ren Watson**, University of Texas At Austin, **Emily Payne**, University of Texas Rio Grande Valley, **Holly Swisher**, Oregon State University and **Gabriel Paul Gray**, University of Dayton (1203-11-42694)

11:30AM *Black Hole Zeckendorf Games*

▶ (357.8) **Caroline Cashman**, William and Mary, **Jenna Martin Shuffelton**, Williams College, **Daeyoung Son**, Williams College and **Steven Joel Miller**, Williams College (1203-102-42653)

**(358) AWM Workshop Special Session on Women in Operator Algebras, I**

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SATURDAY, JANUARY 11 8:00AM-12:00PM 619, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Sarah Reznikoff**, Kansas State University  
**Maria Grazia Viola**, Lakehead University

8:00AM *Limits of Quantum Graphs*  
◆ (358.1) **Jennifer Zhu**, University of Waterloo (1203-46-45112)

8:30AM *A Study of Graph Correspondence Categories*  
▶ ◆ (358.2) **Menevse Eryuzlu**, CU Boulder (1203-46-43671)

9:00AM *Quantum Metrics on Compact Quantum Groups*  
◆ (358.3) **Therese-Marie Basa Landry**, University of California, Santa Barbara (1203-46-45514)

9:30AM *Cuntz-Pimsner algebras of quantum graphs*  
◆ (358.4) **Lara M. Ismert**, Embry-Riddle Aeronautical University (1203-81-40471)

10:30AM *Textile systems and 2-graph  $SC^*$ -algebras for 2D shifts of finite type*  
▶ ◆ (358.5) **Samantha Brooker**, Virginia Tech (1203-46-44818)

11:00AM *Insplitting in textile systems and 2-graphs*  
◆ (358.6) **Ms. Priyanga Ganesan**, University of California San Diego (1203-46-43810)

11:30AM *Uniformly super McDuff  $\{\text{trm}\{II\}_1\}$  factors*  
◆ (358.7) **Jennifer Sarah Pi**, University of Oxford (1203-46-43318)

**(359) CRM-PIMS-AARMS Special Session on Optimal Transport - Theory and Applications, II**

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SATURDAY, JANUARY 11 8:00AM-11:30AM 615, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Young-Heon Kim**, University of British Columbia

**Brendan Pass**, University of Alberta  
**Yanqin Fan**, University of Washington, SEattle  
**Jingwei Hu**, University of Washington  
**Bamdad Hosseini**, University of Washington  
**Zaid Harchaoui**, University of Washington, Seattle  
**Soumik Pal**, University of Washington

8:00AM *Map-compatible Decomposition of transport paths*  
▶ (359.1)

**Qinglan Xia**, University of California at Davis and **Haotian Sun**, Tsinghua University (1203-49-36504)

8:30AM *Spurious Stationarity and Hardness Results for Mirror Descent*  
▶ (359.2)

**Jiajin Li**, University of British Columbia (1203-90-43706)

9:00AM *Transporting Mass with Low Distortion*  
▶ (359.3) **Dan Mikulincer**, University of Washington (1203-60-42578)

9:30AM *Convergence analysis of classical and quantum dynamics via hypocoercivity*  
▶ (359.4)

**Jianfeng Lu**, Duke University (1203-65-44437)

10:00AM *Statistical inference of convex order by martingale optimal transport*  
(359.5) **Jakwang Kim**, University of British Columbia (1203-62-43717)

10:30AM *Pointwise Schauder estimates for optimal transport maps of rough densities*  
(359.6) **Arghya Rakshit**, University of California Irvine (1203-49-44103)

11:00AM *Deterministic sampling with adaptive score based transport modeling*  
▶ (359.7) **Vasily Ilin**, University of Washington, **Jingwei Hu**, University of Washington and **Bamdad Hosseini**, University of Washington (1203-62-40036)

**(360) NSF Special Session on Outcomes and Innovations from NSF Undergraduate Education Programs in the Mathematical Sciences, III**

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SATURDAY, JANUARY 11 8:00AM-12:00PM 603, Level Six, Seattle Convention Center Arch at 705 Pike

Moderators: **Michael Ferrara**, Division of Undergraduate Education, National Science Foundation  
**Michael Ferrara**, Division of Undergraduate Education, National Science Foundation

8:00AM *CANCELLED - Enhancing and Understanding Help-Seeking Behaviors in an Online Precalculus Review Course for Underprepared College Students: Year Three Implementation Report*  
▶ (360.1)

**Guoyang Liu**, The Catholic University of America, **Kiran R Bhutani**, The Catholic University of America and **Kathryn E Bojczyk**, Educational consultant (1203-101-44093)

8:30AM  
▶ (360.2) *Validity of the Algebra Concept Inventory in Predicting Academic Outcomes in College*  
**Claire W. Wladis**, BMCC/CUNY and the CUNY Graduate Center, **Eileen Murray**, CUNY Graduate Center, **Alyse C. Hachey**, University of Texas at El Paso, **Nils Myszkowski**, Pace University, **Benjamin Sencindiver**, University of Texas at San Antonio, **Kathleen Offenholley**, BMCC/CUNY, **Jason Samuels**, BMCC/CUNY and **Geillan Aly**, CUNY Graduate Center (1203-97-41595)

9:00AM  
▶ (360.3) *Examining the Role of Artificial Intelligence in Supporting Mathematics Corequisite Courses*  
**Rita Tewfiq Karam**, RAND Corporation and **Jonathan Schweig**, RAND Corporation (1203-97-42163)

9:30AM  
▶ (360.4) *Stress Without Distress: Strategies for Building a Calculus Active Learning Environment*  
**Melinda Lanius**, Auburn University and **Valentin Kuechle**, Auburn University (1203-97-41976)

10:00AM  
▶ (360.5) *An Interdisciplinary, Problem-Based STEM Curriculum Centered on Research, Design, and Entrepreneurship*  
**Vinodh Kumar Chellamuthu**, Utah Tech University, **Aaron Davis**, Utah Tech University, **Wendy Schatzberg**, Utah Tech University and **Samuel Tobler**, Utah Tech University (1203-104-40929)

10:30AM  
▶ (360.6) *Advancing Course Coordination: The Journey of Foundational Math Coordinators through Professional Development and Instructional Tools*  
**Kimberly Cervello Rogers**, Bowling Green State University and **Nicholas G Long**, Bowling Green State University (1203-97-40362)

11:00AM  
▶ (360.7) *Local Insights from UNC Charlotte: NSF supported UNC System MPAACT (Math Pathways for African American Collegiate Transformation) Project*  
**Taufiqar Khan**, University of North Carolina at Charlotte (1203-101-44651)

11:30AM *Discussion*

### ***(361) SIAM Minisymposium on Navigating the Future of Higher Education: The Role of AI in Teaching, Research, and Extension***

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SATURDAY, JANUARY 11 8:00AM–12:00PM 2B, Level Two,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Rafael Alberto Méndez-Romero**, Universidad del Rosario

**Alvaro Alfredo Ortiz Lugo**, Georgia Gwinnett College

8:00AM  
▶ (361.1) *Integrating AI: Developing a Core Curriculum in a School of Engineering and Sciences*  
**Camilo Rocha**, Pontificia Universidad Javeriana, Cali and **Luis Eduardo Tobón**, Pontificia Universidad Javeriana, Cali (1203-101-45186)

8:30AM  
▶ (361.2) *Converting Hartshorne's *Geometry: Euclid and Beyond* to Lean: A Formalization of Hilbert's Axioms.*  
**Sudhir Murthy**, University of California, Riverside (1203-03-45301)

9:00AM  
▶ (361.3) *Integrating GenAI into Research-Based Courses: Enhancing Learning, Collaboration, and Ethical Awareness*  
**Dr. Mihhail Berezovski, PhD**, Embry-Riddle Aeronautical University (1203-97-40582)

9:30AM  
▶ (361.4) *Designing a Methodology to Enhance Educational Processes through AI Tools: A Case Study at Universidad del Rosario*  
**Juan Nicolas Sepulveda Arias**, Universidad del Rosario - School of Engineering, Science and Technology, **Laura Valentina Hernandez Cardozo**, Universidad del Rosario - School of Engineering, Science and Technology and **Juan Manuel Uribe Quintero**, Universidad del Rosario - School of Engineering, Science and Technology (1203-101-45461)

10:00AM  
▶ ◆ (361.5) *AI-Enhanced Learning: Building Appreciation for the Mathematics Behind Machine Learning and Data Mining*  
**Rei Sanchez-Arias**, The University of North Carolina at Chapel Hill (1203-101-42205)

10:30AM  
◆ (361.6) *ALICE: A Large-Language Model for Zero-Code WebWork Problem Authoring*  
**Kristen Savary**, Edfinity, Clemson University, **Shivram Venkatasubramaniam**, Edfinity and **Sid Grover**, Edfinity (1203-97-41646)

11:00AM  
▶ (361.7) *Incorporating AI and Simulation Tools into the Differential Equations Curriculum for Engineering Students*  
**Juan Bernardo Cano**, Tenured Professor, Facultad de Ingeniería, Universidad de Antioquia, Researcher in Grupo de Investigación en Manejo Eficiente de la Energía (GIMEL), **Nicolas Muñoz**, Tenured Professor, Facultad de Ingeniería, Universidad de Antioquia, Researcher in Grupo de Investigación en Manejo Eficiente de la Energía (GIMEL), **Jesus Maria Lopez**, Tenured Professor, Facultad de Ingeniería, Universidad de Antioquia, Researcher in Grupo de Investigación en Manejo Eficiente de la Energía (GIMEL), **Julio Cesar Saldarriaga**, Researcher in Grupo de Investigación en Infraestructura (GII), Tenured Professor, Facultad de Ingeniería, Universidad de Antioquia, Dean Faculty, Facultad de Ingeniería, Universidad de Antioquia and **Noe Alejandro Mesa**, Head of Electrical Engineering Department, Facultad de Ingeniería, Universidad de Antioquia, Researcher in Grupo de Investigación en Manejo Eficiente de la Energía (GIMEL) (1203-101-44647)

11:30AM *AI-Driven Attack Simulations: Leveraging Language Models in Breach & Attack Simulation platforms*  
 ▶ ◆ (361.8)  
**Juan Sebastian Caballero Roa\***, Principal Author, **Daniel Orlando Diaz Lopez**, Faculty Advisor, **Juan Diego Martinez Paez**, Author and **Juan Esteban Velandia Romero**, Author (1203-68-45033)

**(362) SIGMAA Special Session on Undergraduate Research Activities in Mathematical and Computational Biology, II**

SATURDAY, JANUARY 11 8:00AM–10:00AM 610, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Anne E. Yust**, University of Pittsburgh  
**Erin N Bodine**, Rhodes College  
**Timothy D Comar**, Benedictine University

8:00AM *Data Science in Action: Undergraduate Research Activities in Medicine and Biology*  
 ▶ (362.1)  
**Michelle R. DeDeo\***, University of North Florida (1203-62-40509)

8:30AM *Mathematical modeling of sleep-wake regulation in the developing mammal*  
 ▶ (362.2)  
**Deena R. Schmidt\***, University of Nevada, Reno and **Adrian Samberg**, University of Nevada, Reno (1203-92-44764)

9:00AM *From Recruitment to Publication: A Faculty Guide to Undergraduate Research*  
 ▶ (362.3)  
**Anne E. Yust\***, University of Pittsburgh (1203-101-45138)

**(363) SLMATH (MSRI) Special Session on at the Intersection of Harmonic Analysis and Fractal Geometry, I**

SATURDAY, JANUARY 11 8:00AM–11:30AM 611, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Scott Zimmerman**, The Ohio State University at Marion

**Alex McDonald**, The Ohio State University  
**Samantha Sandberg-Clark**, The Ohio State University  
**Krystal Taylor**, The Ohio State University, Department of Mathematics

8:00AM *Sharp Fourier decay estimates for the well-approximable numbers*  
 (363.1)  
**Robert Fraser\***, Wichita State University and **Thanh Chan Nguyen**, Indiana University (1203-42-40199)

8:30AM *Fourier restriction and well-approximable numbers*  
 ▶ (363.2)  
**Donggeun Ryou\***, Indiana University Bloomington, **Robert Fraser**, Wichita State University and **Kyle Hambrook**, San Jose State University (1203-42-43246)

9:00AM *Arithmetic progressions and some  $\mathbb{R}^d$ -point configurations in compact subsets of  $\mathbb{R}^d$*   
 ▶ (363.3)

**Samantha Sandberg-Clark\***, The Ohio State University and **Krystal Taylor**, The Ohio State University (1203-28-42740)

9:30AM *On a large-scale variant of the Erdős similarity problem*  
 (363.4)  
**Yuveshen Moorooogen\***, University of British Columbia (1203-28-40696)

10:00AM *Does a large Hausdorff dimension imply the existence of a three-point pattern?*  
 ▶ ◆ (363.5)  
**Junjie Zhu\***, University of British Columbia (1203-42-45309)

10:30AM *The Favard Length Problem and Estimates for Polynomials on the Unit Circle*  
 ▶ (363.6)  
**Caleb Z Marshall\***, University of British Columbia and **Izabella Łaba**, University of British Columbia (1203-28-41328)

11:00AM *Prescribed projections and efficient coverings by curves in the plane*  
 (363.7)  
**Alan Chang**, Washington University in St. Louis, **Alex McDonald\***, The Ohio State University and **Krystal Taylor**, The Ohio State University (1203-28-45346)

**TPSE Workshop: Teaching and Managing Large Undergraduate Mathematics Courses in a Changing World**

SATURDAY, JANUARY 11 8:00AM–12:00PM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike

This session will bring together faculty who are connected with the administration and instruction of mathematics courses and programs at large, especially public, universities. Short presentations will highlight challenges and successes in the education of students in these at scale courses, with time allocated to discuss and reflect on the applicability of the material in the presentations to other institutions and settings.

Organizers: **Bryan David Mosher**, University of Minnesota - Twin Cities  
**P Gavin Larose**, University of Michigan

**(364) AMS Contributed Paper Session on Statistics, I**

SATURDAY, JANUARY 11 8:30AM–12:00PM 307, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

8:30AM *Exploring Optimal Sample Sizes for Latent Class Analysis Through Simulation Investigation*  
 (364.1)  
**Gail Han\***, University of West Florida and **Achraf Cohen**, University of West Florida (1203-62-44302)

8:45AM *Aggregation challenges in modeling classroom social networks*  
 ▶ ◆ (364.2)  
**Md Mahedi Hasan\***, Washington State University and **Daryl R. DeFord**, Washington State University (1203-62-44028)

- 9:00AM  
▶ (364.3) *Estimation of Zero-Inflated Population Mean through Resampling Approach*  
**Khyam Paneru\***, The University of Tampa (1203-62-44900)
- 9:15AM  
▶ (364.4) *An approach for estimating the inverse coefficient of variation of a skew normal family*  
**Cong Wang\***, University of Nebraska at Omaha (1203-62-41819)
- 9:30AM  
(364.5) *Rotationally Invariant Testing and Learning*  
**Adam B Kashlak\***, University of Alberta (1203-62-44659)
- 9:45AM  
▶ (364.6) *Intrinsic geometry-inspired dependent toroidal distribution: Application to regression models for astigmatism data*  
**Surojit Biswas\***, Indian Institute of Technology Kharagpur, and **Buddhananda Banerjee\***, Indian Institute of Technology Kharagpur (1203-62-41575)
- 10:00AM  
(364.7) *Tests for the Toeplitz Structure of a Covariance Matrix*  
**Raju Dey\***, Department of Mathematics, Indian Institute of Technology Kharagpur, 721302, India and **Somesh Kumar\***, Department of Mathematics, Indian Institute of Technology Kharagpur, 721302, India (1203-62-36945)
- 10:15AM  
◆ (364.8) *Capturing the uncaptured: How an invariant probability grants a glimpse of the unknown odds ratio in register-based population size estimation*  
**Ann Johnston\***, Penn State University and **Aleksandra Slavković\***, Penn State University (1203-62-43923)
- 10:30AM  
▶ (364.9) *Bayesian Dynamic Factor Analysis*  
**Hadi Safari-Katesari\***, Department of Mathematical Sciences, Stevens Institute of Technology and **Samira Zaroudi\***, John Jay College of Criminal Justice, City University of New York (1203-62-38861)
- 10:45AM  
▶ (364.10) *The Volume over the ROC Surface*  
**Christopher Ratigan\***, Tufts University (1203-62-44648)
- 11:00AM  
▶ (364.11) *CANCELLED Accelerating Convergence in Ridge Regression*  
**Lei-Hsin Kuo\***, University of West Florida (1203-62-44658)
- 11:15AM  
(364.12) *Testing Against the Umbrella Alternative in a Heteroscedastic One-Way ANOVA*  
**Subha Halder\***, IIT Kharagpur and **Somesh Kumar\***, Department of Mathematics, Indian Institute of Technology Kharagpur, 721302, India (1203-62-40537)
- 11:30AM  
▶ ◆ (364.13) *Curtailed Procedures for Binomial Random-sized Subset Selection*  
**Yifang Zhang\***, Syracuse University (1203-62-38713)
- 11:45AM  
▶ (364.14) *On a New Class of Nonsymmetric Copula Family*

**Zamzam Qazi\***, University of Mississippi and **Martial Longla\***, University of Mississippi (1203-62-39477)

***(365) AMS Special Session on Categorical Generalizations of Conditionalization, I***

SATURDAY, JANUARY 11 8:30AM–12:00PM Yakima 1, Level 1, Seattle Convention Center Arch at 800 Pike

Organizers: **Owen Biesel\***, Southern Connecticut State University  
**Colin McSwiggen\***, New York University  
**Michael Titelbaum\***, University of Wisconsin -- Madison  
**Theodore V Theodosopoulos\***, Nueva School

8:30AM  
▶ (365.1) *A Survey of Learning Rules: In Search of Unity in Diversity*  
**Hanti Lin\***, University of California, Davis (1203-60-44527)

9:00AM  
▶ (365.2) *Generalizing the symmetry argument for conditionalization*  
**Xueyin (Snow) Zhang\***, University of California, Berkeley (1203-60-45699)

9:30AM *Discussion 1*

10:00AM  
▶ (365.4) *An Introduction to Markov Categories and Conditioning*  
**Tobias Fritz\***, University of Innsbruck (1203-60-43610)

10:30AM  
(365.5) *A Categorical Theory of Conditional Expectations*  
**Paolo Perrone\***, University of Oxford (1203-60-43436)

11:00AM *Discussion 2*

11:30AM  
▶ (365.7) *Updating on uncertain evidence*  
**Giovanni Duca\***, Northeastern University (1203-60-44320)

***(366) AMS Special Session on Extremal and Probabilistic Combinatorics, I***

SATURDAY, JANUARY 11 8:30AM–12:00PM Tahoma 3, Level Three, Seattle Convention Center Arch at 800 Pike

Organizers: **Lina Li\***, Iowa State University  
**Ruth Luo\***, University of California, San Diego  
**Jd Nir\***, Oakland University

8:30AM  
▶ (366.1) *The largest isosceles triangle-free subset of the grid*  
**Adam Zsolt Wagner\***, Google DeepMind (1203-05-42550)

9:00AM  
▶ (366.2) *A Smorgasbord of Small Ramsey Numbers*  
**Bernard Lidický\***, Iowa State University, **Gwen McKinley\***, Center for Communications Research, La Jolla, **Florian Pfender\***, University of Colorado Denver and **Steven Van Overberghe\***, Ghent University (1203-05-41991)

9:30AM *Towards the Overfull Conjecture*  
(366.3) **Songling Shan**<sup>\*</sup>, Auburn University (1203-05-40096)

10:00AM *Monochromatic Rectangles in Grids*  
▶ (366.4) **Jason O'Neill**<sup>\*</sup>, Cal State LA, **Gary Ruiz-Navarro**, Cal State LA, **Jonathan Davidson**, Cal State LA and **Israel Wilbur**, Cal State LA (1203-05-41246)

10:30AM *A general theorem in spectral extremal graph theory*  
▶ (366.5) **John Byrne**<sup>\*</sup>, University of Delaware, **Dheer Noal Desai**, University of Memphis and **Michael Tait**, Villanova University (1203-05-41974)

11:00AM *Beyond the classification theorem of Cameron, Goethals, Seidel and Shult*  
▶ (366.6) **Hricha Acharya**, Arizona State University and **Zilin Jiang**<sup>\*</sup>, Arizona State University (1203-05-39228)

11:30AM *Constant Longest Path Transversals in Sufficiently Dense Graphs*  
(366.7) **Andrzej Czygrinow**, Arizona State University, **Kevin G Milans**<sup>\*</sup>, West Virginia University and **Jackson Porter**, West Virginia University (1203-05-42534)

### ***(367) AMS Special Session on Financial Mathematics, I***

**SATURDAY, JANUARY 11 8:30AM–12:00PM 205, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizer: **Sixian Jin**, Worcester Polytechnic Institute

8:30AM *Vector-valued robust stochastic control with applications to finance*  
▶ (367.1) **Igor Cialenco**<sup>\*</sup>, Illinois Institute of Technology and **Gabriela Kovacova**, UCLA (1203-49-41550)

9:00AM *Optimal Harvesting Problems with Mean Field Interactions*  
(367.2) **Chao Zhu**<sup>\*</sup>, University of Wisconsin-Milwaukee (1203-93-43189)

9:30AM *Distribution Builder Method for Optimal Selling with Consideration of Ruin*  
▶ (367.3) **Sixian Jin**<sup>\*</sup>, California State University San Marcos and **Stephan Sturm**, Worcester Polytechnic Institute (1203-91-43665)

10:00AM *Set-Valued Stochastic Integrals and Convolved Lévy Processes*  
(367.4) **Weixuan Xia**<sup>\*</sup>, University of Southern California (1203-60-41767)

10:30AM *Sequential optimal contracting in continuous time*  
(367.5) **Guillermo Alonso Alvarez**<sup>\*</sup>, University of Michigan (1203-91-42892)

11:00AM *Fractional Brownian Motion: Small Increments and First Exit Time from One-sided Barrier*  
▶ (367.6) **Abstract**  
**Qidi Peng**<sup>\*</sup>, Claremont Graduate University (1203-60-44791)

11:30AM *Directed chain reflecting stochastic differential equation and its application*  
▶ (367.7) **Tomoyuki Ichiba**<sup>\*</sup>, University of California Santa Barbara (1203-60-42537)

### ***(368) AMS Special Session on Generative AI for Improving Instructional Productivity, I***

**SATURDAY, JANUARY 11 8:30AM–12:00PM Chelan 5, Level 2, Seattle Convention Center Arch at 800 Pike**

Organizers: **Erich McAlister**, Fort Lewis College  
**Feryal Alayont**, Grand Valley State University

8:30AM *Innovative Uses of Generative AI for Enhanced Teaching and Learning*  
▶ (368.1) **Lewis D. Ludwig**<sup>\*</sup>, Denison University (1203-101-36709)

9:00AM *Open Conversation Time*

9:30AM *Revolutionizing Assessment Creation with QGenAI: Harnessing AI for Engaging and Efficient Teaching*  
▶ ◆ (368.3) **Jaffar Ali Shahul Hameed**<sup>\*</sup>, Florida Gulf Coast University (1203-68-42597)

10:00AM *Teaching Prompt Engineering to Help Students Generate Practice Problems*  
▶ (368.4) **Korana Burke**<sup>\*</sup>, University of California, Davis (1203-97-42383)

10:30AM *Creating Interactive Lecture Supplements with Generative AI*  
▶ (368.5) **Bevin L Maultsby**<sup>\*</sup>, NC State University (1203-101-44540)

11:00AM *Artificial Intelligence and Precalculus in Southwest Colorado: Leveraging ChatGPT to help create relevant and place-based mathematics*  
▶ (368.6) **Anna Marie Bergman**<sup>\*</sup>, Fort Lewis College (1203-101-41682)

11:30AM *Leveraging Generative AI for Enhanced Computational Thinking*  
▶ ◆ (368.7) **Qingxia Li**<sup>\*</sup>, Fisk University and **Xinyao Yang**, Xi'an Jiaotong Liverpool University (1203-101-39772)

### ***(369) AWM Workshop Special Session on Women in Groups, Geometry, and Dynamics, I***

**SATURDAY, JANUARY 11 8:30AM–12:00PM 4C-1, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizers: **Rachel Skipper**, University of Utah  
**Carolyn Abbott**, Brandeis University

8:30AM *Nonpositive curvature of locally reducible Artin groups*  
(369.1) **Jill Mastrocola**<sup>\*</sup>, Boston College (1203-20-44441)

9:00AM *Centers of Artin Groups Defined on Cones*  
(369.2) **MurphyKate Montee**<sup>\*</sup>, Carleton College (1203-20-37746)

- 9:30AM *On subgroups of right-angled Artin groups.*  
 ▶ ◆  
 (369.3) **Jone Lopez de Gamiz Zearra**<sup>\*</sup>, Vanderbilt University (1203-20-40542)
- 10:00AM *Break*
- 10:30AM *Groups Acting on the Trivalent Tree*  
 (369.5) **Arianna Zikos**<sup>\*</sup>, Wesleyan University (1203-20-42262)
- 11:00AM *Frattini subgroups of hyperbolic like groups*  
 (369.6) **Gil Goffer**<sup>\*</sup>, University of California at San Diego, **Denis V Osin**, Vanderbilt University and **Ekaterina Rybak**, Vanderbilt University (1203-20-44000)
- 11:30AM *Hyperbolicity of Random Branched Coverings*  
 ▶ (369.7) **Hyeran Cho**<sup>\*</sup>, Ohio State University, **Jean-Francois Lafont**, Ohio State University and **Rachel Skipper**, University of Utah (1203-51-43434)

**(370) ILAS Special Session on Preserver Problems, I**

**SATURDAY, JANUARY 11 8:30AM–11:00AM 211, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Chi-Kwong Li**, College of William and Mary  
**Sushil Singla**, Phd Student, Department of Mathematics, Shiv Nadar University Delhi NCR  
**Bojan Kuzma**, University of Primorska  
**Edward Poon**, Embry-Riddle Aeronautical University

- 8:30AM *Singular linear preservers of majorization*  
 ▶ (370.1) **Koratti C Sivakumar**<sup>\*</sup>, Indian Institute of Technology Madras (1203-15-45420)
- 9:00AM *CANCELLED Preservers of Totally Nonnegative Matrices*  
 ▶ (370.2) **Shaun M Fallat**<sup>\*</sup>, University of Regina (1203-15-40550)
- 9:30AM *Positivity preservers over finite fields*  
 (370.3) **Prateek Kumar Kumar Vishwakarma**<sup>\*</sup>, Indian Institute of Science (1203-15-40499)
- 10:00AM *CANCELLED - Tree Covers of Graphs and their Linear Preservers*  
 ▶ (370.4) **Leroy B Beasley**<sup>\*</sup>, Utah State University (1203-05-41183)
- 10:30AM *Linear  $sk$ -power preservers and trace of power-product preservers*  
 ▶ (370.5) **Huajun Huang**<sup>\*</sup>, Auburn University (1203-15-39900)

**JMM Panel on The Role of Technology in Linear Algebra Education**

**SATURDAY, JANUARY 11 8:30AM–10:00AM 4C-4, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizers: **Judi J McDonald**, Washington State University  
**Sepideh Stewart**, University of Oklahoma  
**Sepideh Stewart**, University of Oklahoma

**Judi J McDonald**, Washington State University  
**Sheldon Axler**, San Francisco State University  
**Jeffrey Meyer**, California State University, San Bernardino  
**Emily J Evans**, Brigham Young University  
**David M. Strong**, Pepperdine University  
**Frank Uhlig**, Auburn University  
**Mike Michailidis**, The MathWorks, Inc.  
**Gabriel Martins**, CSU Sacramento

**(371) NAM Claytor-Woodard Lecture - Tai-Danae Bradley, Sandbox AQ**

**SATURDAY, JANUARY 11 8:30AM–9:35AM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Aris Winger**, Georgia Gwinnett College  
**Torina D. Lewis**, National Association of Mathematicians  
**Asamoah Nkwanta**, Morgan State University

- 8:30AM *Structure in Language: A Category Theoretical Perspective*  
 ▶ (371.1) **Tai-Danae Bradley**<sup>\*</sup>, SandboxAQ (1203-18-40682)

**(372) AMS Contributed Paper Session on Topics in Analysis**

**SATURDAY, JANUARY 11 9:00AM–12:00PM 309, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

- 9:00AM *Generalizations of Some Cyclic Inequalities*  
 ▶ (372.1) **Wei-Kai Lai**<sup>\*</sup>, University of South Carolina Salkehatchie (1203-26-43206)
- 9:15AM *CANCELLED General fractals represented by  $\mathcal{F}$ -limit sets of compression maps*  
 ▶ (372.2) **Qinglan Xia**<sup>\*</sup>, University of California at Davis, **Tynan Lazarus**, University of Arizona and **Enrique Guadalupe Alvarado**, UC Davis (1203-28-36501)
- 9:30AM *Sums of Gegenbauer Polynomials*  
 ▶ (372.3) **Riley White**<sup>\*</sup>, California State University Fresno and **Khang Duc Tran**, California State University, Fresno (1203-30-43779)
- 9:45AM *Blaschke Products and Convolutions with a Slanted Generalized Half-Plane Harmonic Mapping*  
 (372.4) **Stacey Muir**<sup>\*</sup>, The University of Scranton (1203-30-44993)
- 10:00AM *Entire functions with an arithmetic sequence of exponents*  
 ▶ (372.5) **Khang Duc Tran**<sup>\*</sup>, California State University, Fresno and **Dallas Ruth**, California State University, Fresno (1203-30-39511)
- 10:15AM *Borel lemma: geometric progression vs. Riemann zeta-function*  
 ▶ ◆  
 (372.6) **Qi Han**<sup>\*</sup>, Texas A&M University-San Antonio (1203-30-43379)

10:30AM  
▶ (372.7) *Minimal Error Functions on Irregular Subsets of the Real Line*  
**Robert M Dukes**<sup>\*</sup>, University of New Mexico and **Maxim Zinchenko**, University of New Mexico (1203-30-41044)

10:45AM  
▶ ◆ (372.8) *Observations on Weighted Toeplitz Operators and Symbol Constructions in Bergman Spaces*  
**Mehmet Celik**, Texas A&M University-Commerce, **Wynesakia Akamah**<sup>\*</sup>, Rose-Hulman Institute of Technology, **Avinash Iyer**, Occidental College and **Jennifer Ye Yuan**, New York University Abu Dhabi (1203-30-42936)

11:00AM  
(372.9) *Boundary integral approaches for spectral shape optimization*  
**Kshitij Anand Patil**<sup>\*</sup>, Simon Fraser University and **Nilima Nigam**, Simon Fraser University (1203-31-42541)

11:15AM  
(372.10) *Some Remarks on Mappings with Generalized Parametric Representation in the Ball*  
**Jerry R Muir**<sup>\*</sup>, The University of Scranton (1203-32-44820)

11:30AM  
(372.11) *Spin Leonard pairs and the proof of the Kresch-Tamvakis Conjecture*  
**Taiyo S Terada**<sup>\*</sup>, Portland State University and **John Caughman**, Portland State University (1203-33-43234)

### ***(373) AMS Special Session on Concordance and Cobordism in Low Dimensions, I***

**SATURDAY, JANUARY 11 9:00AM–12:00PM 620, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Abhishek Mallick**, Rutgers University  
**Maggie Miller**, Clay Mathematics Institute  
**Ryan Stees**, Indiana University

9:00AM  
▶ (373.1) *Milnor invariants through intersection theory and bar constructions*  
**Greg B Friedman**, Texas Christian University, **Nir Gadish**, University of Pennsylvania, **Robin Koytcheff**, University of Louisiana at Lafayette, **Dev Prakash Sinha**<sup>\*</sup>, University of Oregon and **Ben Walter**, University of the Virgin Islands (1203-57-40477)

9:30AM  
▶ (373.2) *Bar-Natan Homology for links in  $RP^3$  and genus bound*  
**Daren Chen**<sup>\*</sup>, Caltech (1203-57-42473)

10:00AM  
▶ (373.3) *Slice Surfaces and Immersed Curves*  
**Gary Guth**<sup>\*</sup>, Stanford University (1203-57-42581)

10:30AM  
▶ (373.4) *Rationally slice knots and homology cobordism*  
**Sally Collins**<sup>\*</sup>, Michigan State University (1203-57-44274)

11:00AM  
(373.5) *Spherical simple knots in lens spaces*  
**Shiyu Liang**<sup>\*</sup>, UT Austin (1203-57-42451)

11:30AM  
(373.6) *Twist positivity, L-space knots, and concordance*

**Siddhi Krishna**<sup>\*</sup>, Columbia University and **Hugh Morton**, University of Liverpool (1203-57-45113)

### ***(374) AMS Special Session on Control Theory and Artificial Intelligence, I***

**SATURDAY, JANUARY 11 9:00AM–12:00PM 210, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Mohamed Ali Belabbas**, University of Illinois  
**Anthony Michael Bloch**, University of Michigan

9:00AM  
(374.1) *Neuromimetic Control*  
**John Baillieul**<sup>\*</sup>, Division of Systems Engineering, Boston University and **Zexin Sun**, Division of Systems Engineering, Boston University (1203-93-40948)

9:30AM  
▶ (374.2) *Bringing the Heat: Swift Trajectory Planning with Spatial-Pseudospectral Techniques*  
**Ramanarayan Vasudevan**<sup>\*</sup>, University of Michigan (1203-49-40767)

10:00AM  
(374.3) *Control Theoretic Approach to Fine-Tuning and Transfer Learning*  
**Mohamed Ali Belabbas**<sup>\*</sup>, University of Illinois (1203-49-43140)

10:30AM  
(374.4) *Geometric Adjoint Sensitivity Analysis for DAEs, Lie Groups, and PDEs*  
**Melvin Leok**<sup>\*</sup>, University of California, San Diego and **Brian Tran**, Los Alamos National Laboratories (1203-93-43159)

11:00AM  
▶ (374.5) *Direct Policy Optimization in Control: Geometry and Algorithms*  
**Mehran Mesbahi**<sup>\*</sup>, University of Washington (1203-49-40825)

11:30AM  
(374.6) *Symmetric Discrete Optimal Control and Machine Learning*  
**Anthony Michael Bloch**<sup>\*</sup>, University of Michigan (1203-49-41104)

### ***(375) AMS Special Session on Function Spaces and Their Applications, I***

**SATURDAY, JANUARY 11 9:00AM–12:00PM 203, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **William Verreault**, University of Toronto  
**Javad Mashreghi**, Laval University

9:00AM  
▶ (375.1) *Interactions between universality of composition operators and complex dynamics*  
**Myrto Manolaki**<sup>\*</sup>, University College Dublin (1203-30-42830)

9:30AM  
▶ (375.2) *Biharmonic Green's function, harmonic reproducing kernels in multiply connected domains*  
**Dmitry Khavinson**<sup>\*</sup>, University of South Florida (1203-30-40688)

10:00AM  
▶ ◆ (375.3) *Cauchy transforms, Hardy spaces and random walks on  $PSL_2(\mathbb{R})$ : an unexpected connection*

**Petr Kosenko**<sup>\*</sup>, University of British Columbia (1203-46-42439)

10:30AM  
► (375.4) *Uniqueness sets for short time Fourier transforms and Wigner distributions*  
**Eugenia Malinnikova**<sup>\*</sup>, Stanford University (1203-46-43961)

11:00AM  
(375.5) *Unbounded multipliers of complete Pick spaces*  
**Michael T. Jury**<sup>\*</sup>, University of Florida and  
**Robert T.W. Martin**, University of Manitoba (1203-47-43947)

11:30AM  
(375.6) *Inertia-preserving matrix transforms*  
**Dominique Guillot**<sup>\*</sup>, University of Delaware,  
**Alexander Belton**, University of Plymouth,  
**Apoorva Khare**, Indian Institute of Science and  
**Mihai Putinar**, UCSB (1203-30-44411)

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**(376) AMS Special Session on Nonlinear Algebraic Methods in Artificial Intelligence and Machine Learning, I**

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**SATURDAY, JANUARY 11 9:00AM–12:00PM Skagit 3, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizer: **Jonathan Gryak**, University of Michigan, Ann Arbor

9:00AM  
(376.1) *An Overview of Nonlinear Algebraic Data Analysis*  
**Jonathan Gryak**<sup>\*</sup>, Queens College, City University of New York (1203-68-45410)

9:30AM  
► (376.2) *Introduction to numerical algebraic geometry*  
**Paul Breiding**<sup>\*</sup>, Technische Universität Berlin (1203-14-43408)

10:00AM  
(376.3) *Tensor-Based Approach to Synchronization*  
**Joe Kileel**<sup>\*</sup>, University of Texas at Austin (1203-68-38137)

10:30AM  
► (376.4) *Using numerical algebraic geometry for enhanced learning*  
**Jonathan D. Hauenstein**<sup>\*</sup>, University of Notre Dame (1203-65-42054)

11:00AM  
► (376.5) *Nonlinear algebra for spatiotemporal trajectories*  
**Heather A Harrington**<sup>\*</sup>, University of Oxford (1203-55-44425)

11:30AM  
(376.6) *Galois-Theoretic Measures of Algebraic Complexity*  
**Timothy Duff**<sup>\*</sup>, University of Missouri (1203-12-39268)

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**(377) AMS Special Session on Vector Bundles and Quantization, I**

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**SATURDAY, JANUARY 11 9:00AM–12:00PM 614, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Steven Rayan**, University of Saskatchewan  
**Ruxandra Moraru**, University of Waterloo  
**Laura P. Schaposnik**, University of Illinois at Chicago

9:00AM  
◆ (377.1) *Skein Quantization for Decorated Character Varieties*

**Jennifer Marie Brown**<sup>\*</sup>, University of Edinburgh and **David Jordan**, University of Edinburgh (1203-57-41065)

9:30AM  
► (377.2) *Spectral curves, topological recursion, and quantization*  
**Motohico Mulase**<sup>\*</sup>, University of California at Davis (1203-14-44311)

10:00AM *Break*

11:00AM  
◆ (377.4) *The conformal limit for parabolic Higgs bundles*  
**Laura Fredrickson**<sup>\*</sup>, University of Oregon (1203-53-39328)

11:30AM  
◆ (377.5) *The KSBA moduli space of log Calabi-Yau surfaces*  
**Hulya Arguz**<sup>\*</sup>, University of Georgia (1203-14-39549)

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**(378) ASL Invited Address - Daniel Turetsky, Victoria University of Wellington**

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**SATURDAY, JANUARY 11 9:00AM–10:00AM 2A, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizer: **David Reed Solomon**, University of Connecticut

9:00AM  
(378.1) *True stages for computability and effective descriptive set theory*  
**Daniel Turetsky**<sup>\*</sup>, Victoria University of Wellington (1203-03-42104)

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**CANCELLED Professional Enhancement Program (PEP) 3B: Mentoring for Equity: Accounting for Identity and Culture in Our Most Important of Relationships**

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**SATURDAY, JANUARY 11 9:00AM–11:00AM Willow A, Second Floor, Sheraton Grand Seattle**

On completing this PEP, participants are expected to gain: - A more inclusive and expansive definition of mentoring that facilitates broadening participation in mathematics. - Increased awareness of the impact of identity and culture on mentoring and methods to use these differences as strengths in the mentoring relationship. - Access to multiple inclusive mentoring practices, ranging from concrete actions for immediate implementation to more impactful changes that will require more work over time.

Organizers: **Emily Moore**, University of Oregon  
**Michael Dorff**, Brigham Young University  
**Aris Winger**, Georgia Gwinnett College  
**Abbe Herzig**, American Mathematical Society

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**COMAP Workshop on Modeling for Educators: Introducing All Students to Modeling**

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**SATURDAY, JANUARY 11 9:00AM–3:00PM Tahoma 1, Level Three, Seattle Convention Center Arch at 800 Pike**

This workshop will explore a variety of activities for introducing mathematical modeling to students with

prerequisite knowledge of Algebra II or higher. This hands-on session will provide participants with the opportunity to build multiple real-world inspired models that utilize curricular mathematics and highlight modeling competencies. Approaches for adapting COMAP contest problems as well as known models for classroom use will also be explored. Numerous modeling resources will be shared.

Organizers: **Kayla Blyman**, Saint Martin's University  
**Kayla Blyman**, Saint Martin's University  
**Adewale Adeolu**, Clarkson University  
**Ben Galluzzo**, Consortium for Mathematics and Its Applications (COMAP)  
**Kim A Kuda**, COMAP

### Exhibits and Book Sales

SATURDAY, JANUARY 11 9:00AM-12:00PM Hall 4A, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: **AMS Meetings Department**, American Mathematical Society

### (379) ILAS Special Session on Randomness in Numerical Linear Algebra, I

SATURDAY, JANUARY 11 9:00AM-12:00PM 204, Level Two, Seattle Convention Center Arch at 705 Pike

Organizers: **Heather Denise Wilber**, University of Washington  
**Anne Greenbaum**, University of Washington

9:00AM (379.1) *Randomization in computational linear algebra*  
**Per-Gunnar Martinsson**<sup>\*</sup>, Department of Mathematics, UT-Austin (1203-65-42666)

10:00AM (379.2) *Near-optimal hierarchical matrix approximation from matrix-vector products*  
**Tyler Chen**<sup>\*</sup>, New York University (1203-68-39427)

10:30AM *Break*

11:00AM (379.4) *Efficient Randomized Sampling with Tagging for Rank-Structured Matrix Compression*  
**Katherine J Pearce**<sup>\*</sup>, Oden Institute at UT-Austin, **Anna Yesypenko**, Oden Institute at UT-Austin, **James Levitt**, Oden Institute at UT-Austin and **Per-Gunnar Martinsson**, Oden Institute at UT-Austin, Department of Mathematics, UT-Austin (1203-65-39433)

11:30AM (379.5) *Could a randomized least-squares solver be the default in your favorite programming language?*  
**Ethan Epperly**<sup>\*</sup>, California Institute of Technology, **Maïke Meier**, University of Oxford and **Yuji Nakatsukasa**, University of Oxford (1203-65-36596)

### JMM Networking Center - Skybridge

SATURDAY, JANUARY 11 9:00AM-2:00PM Hall 4D - Skybridge, Level Four, Seattle Convention Center Arch at 705 Pike

JMM Networking Center - Skybridge

Organizer: **AMS Meetings Department**, American Mathematical Society

### JMM Networking Center - Tahoma Foyer

SATURDAY, JANUARY 11 9:00AM-2:00PM Tahoma Foyer, Level Three, Seattle Convention Center Arch at 800 Pike

JMM Networking Center - Tahoma Foyer

Organizer: **AMS Meetings Department**, American Mathematical Society

### Julia Robinson Math Festival

SATURDAY, JANUARY 11 9:00AM-12:00PM Hall 4B, Level Four, Seattle Convention Center Arch at 705 Pike

Join us for a Julia Robinson Math Festival, where you'll get to explore a variety of fun, hands-on math puzzles and games. The Math Festival will have activities for children and adults of all ages. You'll leave the festival with your own take-home game kit and information on how you can bring a math festival to your own community.

Organizer: **Daniel Kline**, Julia Robinson Mathematics Festival

### (380) AMS Contributed Paper Session on Numerical Analysis, I

SATURDAY, JANUARY 11 9:30AM-11:30AM 305, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

9:30AM (380.1) *Analytical and Numerical Investigation of Damped Frequencies in Beams with Viscoelastic Foundations*  
**Rab Nawaz**<sup>\*</sup>, COMSATS University Islamabad (1203-65-42431)

9:45AM (380.2) *Numerical Mean-square and Asymptotic Stability Analysis for the Weak Simpson Method*  
**Ram Sharan Adhikari**<sup>\*</sup>, Rogers State University (1203-65-40112)

10:00AM (380.3) *Coupling RBF-FD with the Parareal Framework to Solve Time-Dependent PDEs*  
**Jacob Blazejewski**<sup>\*</sup>, Michigan Technological University, **Nadun L Kulasekera**, **Mudiyanselage**, Mount St Mary's University, **Cecile M Piret**, Michigan Technological University and **Benjamin Ong**, Michigan Technological University (1203-65-44526)

10:15AM (380.4) *High-Order Integration on Surfaces with Meshfree Methods for Partial Differential Equations*  
**Daniel Robert Venn**<sup>\*</sup>, Simon Fraser University and **Steven J Ruuth**, Simon Fraser University (1203-65-42409)

10:30AM (380.5) *Convergence Analysis for Edge-Informed Gaussian PSF Approximations*

Jessica Li<sup>\*</sup>, University of Virginia, Nicholas Biglin, Trinity College Dublin / Columbia University and Ansh Desai, University of Delaware (1203-65-37643)

10:45AM *Towards Tuning-Free Minimum-Volume Nonnegative Matrix Factorization*  
▶ ◆  
(380.6) Duc Toan Nguyen<sup>\*</sup>, Texas Christian University and Eric C. Chi, Department of Statistics, Rice University (1203-65-39590)

11:00AM *A Hybrid Gauss--Newton Method for Convex Inclusion and Convex-Composite Optimization Problems*  
▶ (380.7) Samundra Regmi<sup>\*</sup>, Department of Mathematics, University of Houston, Houston, TX 77004, USA, Andreas Mang, Department of Mathematics, University of Houston, Houston, TX 77004, USA, Loic Cappanera, Department of Mathematics, University of Houston, Houston, TX 77004, USA, Ioannis K. Argyros, Department of Computing and Mathematical Sciences, Cameron University, Lawton, OK 73505, USA and Santhosh George, Department of Mathematical and Computational Sciences, National Institute of Technology Karnataka, India-575 025 (1203-65-43619)

11:15AM *The Boosted DC Algorithm for Clustering and Set Clustering with Constraints*  
▶ ◆  
(380.8) Tuyen Tran<sup>\*</sup>, Loyola University Chicago (1203-65-45794)

**(381) AMS Lecture on Education - Pamela Harris, University of Wisconsin-Milwaukee**

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SATURDAY, JANUARY 11 9:40AM-10:45AM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: Brian D. Boe, University of Georgia

9:40AM *The Myth of the Symmetric Difference: Mathematics and Mathematics Education*  
▶ ◆  
(381.1) Pamela Estephania Harris<sup>\*</sup>, University of Wisconsin, Milwaukee (1203-00-44598)

**(382) ASL Invited Address - Jinhe Ye, University of Oxford**

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SATURDAY, JANUARY 11 10:00AM-11:00AM 2A, Level Two, Seattle Convention Center Arch at 705 Pike

Organizer: David Reed Solomon, University of Connecticut

10:00AM *Lang-Weil estimate in finite difference fields*  
▶ (382.1) Martin Hils, University of Münster, Ehud Hrushovski, University of Oxford, Jinhe Ye<sup>\*</sup>, University of Oxford and Tingxiang Zou, University of Bonn (1203-03-41756)

**Exhibitor Presentation Theater**

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SATURDAY, JANUARY 11 10:00AM-12:00PM Hall 4A, Level Four, Seattle Convention Center Arch at 705 Pike

Organizer: AMS Meetings Department, American Mathematical Society

**NAM Business Meeting**

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SATURDAY, JANUARY 11 10:00AM-11:00AM 4C-3, Level Four, Seattle Convention Center Arch at 705 Pike

Organizers: Torina D. Lewis, National Association of Mathematicians  
Asamoah Nkwanta, Morgan State University  
Aris Winger, Georgia Gwinnett College

**MAA Panel: Teaching and Learning Calculus in an AI World**

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SATURDAY, JANUARY 11 10:30AM-12:00PM 4C-4, Level Four, Seattle Convention Center Arch at 705 Pike

Since the release of Wolfram Alpha (2009), mathematics educators have been contending with the interface of technology that answers mathematical questions and teaching and learning mathematics. Today's Large Language Models and algorithmic software make this question even more relevant. The panelists will discuss their thinking about concepts central to understanding calculus and how instruction can be shaped so learning takes place, share strategies from their classrooms, and lessons learned.

Organizers: Gail F Burrill, Michigan State University  
Deborah Hughes-Hallett, Harvard Kennedy School  
Megan McLean, Lewis and Clark High School, Spokane, WA  
Thomas Dick, Oregon State University  
Chris Lane, Pacific University

**(383) JPBM Communications Award Lecture - Eugenia Cheng, School of the Art Institute of Chicago**

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SATURDAY, JANUARY 11 10:50AM-11:55AM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike

Organizer: J. Michael Pearson, Mathematical Association of America

10:50AM *Math, Art, Social Justice*  
▶ (383.1) Eugenia Cheng<sup>\*</sup>, School of the Art Institute of Chicago (1203-104-36492)

**SLMath (MSRI) & NAM: Film World Premiere of George Csicsery's "Journeys of Black Mathematicians: Part 2" and Panel Discussion**

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SATURDAY, JANUARY 11 11:30AM-1:00PM 4C-3, Level Four, Seattle Convention Center Arch at 705 Pike

World Premiere of George Csicsery's new film. This documentary series features interviews with contemporary Black American researchers and educators and surveys innovative educational programs in math at every level from grade school through undergraduate and postdocs. At the conclusion of the screening there will be a panel

discussion. (For information on the film series, visit [jbmfilm.com](http://jbmfilm.com).)

Organizers: **Asamoah Nkwanta**, Morgan State University

**Tatiana Toro**, Simons Laufer Mathematical Sciences Institute (SLMath) / MSRI

**George Paul Csicsery**, Zala Films

**Jennifer Murawski**, MSRI

**Uta Lorenzen**, Simons Laufer Mathematical Sciences Institute (SLMath) / MSRI

**George Paul Csicsery**, Zala Films

### ***(384) AIM Special Session on Applications and Generalizations of Zero Forcing, II***

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**SATURDAY, JANUARY 11 1:00PM–5:00PM 3B, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Veronika Furst**, Fort Lewis College

**Mary Flagg**, University of St. Thomas

1:00PM  
► (384.1) *Recent progress on conjectures about zero forcing sets and forts*

**Boris Brimkov**<sup>\*</sup>, Slippery Rock University (1203-05-44878)

2:00PM  
(384.2) *Compatible forts and maximum nullity of a graph*

**John Hutchens**<sup>\*</sup>, University of San Francisco, **Veronika Furst**, Fort Lewis College, **Lon Mitchell**, Eastern Michigan University and **Yaqi Zhang**, University Chongqing Research Institute of Big Data (1203-05-41750)

2:30PM  
(384.3) *On the number of minimal forts of a graph*  
**Thomas R. Cameron**<sup>\*</sup>, Penn State Behrend (1203-05-44449)

3:00PM  
(384.4) *Minimum Rank of Graphs of Order Eight*  
**Wayne Barrett**, Brigham Young University, **Mark Hunnell**<sup>\*</sup>, Winston-Salem State University, **John Hutchens**, University of San Francisco and **John Sinkovic**, Brigham Young University - Idaho (1203-05-41930)

3:30PM  
(384.5) *Probabilistic zero forcing with vertex reversion*  
**Zachary Brennan**<sup>\*</sup>, Iowa State University (1203-60-41276)

4:00PM  
► ♦ (384.6) *Discrete-time Immunization Number*  
**Karen L Collins**<sup>\*</sup>, Wesleyan University, **Ann N. Trenk**, Wellesley College, **Margaret-Ellen Messinger**, Mount Allison University, Sackville, NB Canada, **Adrian Vetta**, McGill Univ., Montreal, Quebec, Canada and **Nancy E Clarke**, Acadia University (1203-05-40840)

4:30PM *Discussion*

### ***(385) AIM Special Session on Pedagogical Practices in Math Circles and Other Non-Traditional, Informal, and Recreational Math Spaces, II***

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**SATURDAY, JANUARY 11 1:00PM–5:00PM 3A, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Li-Mei Lim**, Boston University

**Douglas O'Roark**, Math Circles of Chicago  
**Amber Verser**, Hampshire College Summer Studies in Mathematics

1:00PM  
► (385.1) *Concentric (Math) Circles in Houston: Ideas & Lessons for Math Enrichment in New Contexts*  
**Noel Perkins**<sup>\*</sup>, Math Circles of Houston (1203-97-44630)

1:30PM  
► (385.2) *MathShows for Math Circles*  
**Aaron T Wilson**, University of Texas Rio Grande Valley, **Sergey Grigorian**<sup>\*</sup>, University of Texas Rio Grande Valley, **Dr. Mayra Lizeth Ortiz, Ph.D.**, University of Texas Rio Grande Valley and **Xiaohui Wang**, University of Texas Rio Grande Valley (1203-101-45041)

2:00PM  
► (385.3) *Contrasting Pedagogical Goals of Math Circles Versus Other Settings*  
**Amanda Katharine Serenevy**<sup>\*</sup>, Riverbend Community Math Center (1203-101-45552)

2:30PM  
► (385.4) *Creating Effective Lesson Plans for Math Circles*  
**Philip Charles Dituri**<sup>\*</sup>, Dituri Consulting, FiCycle (1203-101-41113)

3:00PM *Break*

3:30PM  
► (385.6) *Cultivating Creativity through Community*  
**Axel Brandt**<sup>\*</sup>, The Math Movement (1203-101-43514)

4:00PM  
► (385.7) *Puzzles and Games for Math Circles by the Julia Robinson Mathematics Festival*  
**Daniel Kline**<sup>\*</sup>, Julia Robinson Mathematics Festival (1203-101-43295)

### ***AMS Business Meeting***

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**SATURDAY, JANUARY 11 1:00PM–2:00PM Ballroom 6E, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizer: **Boris Hasselblatt**, Tufts University

### ***(386) AMS Contributed Paper Session on Numerical Analysis, II***

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**SATURDAY, JANUARY 11 1:00PM–3:15PM 305, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

1:00PM  
► (386.1) *CANCELLED - A deep learning technique for solving differential equations*  
**Saurabh Tomar**<sup>\*</sup>, Indian Institute of Technology (IIT) Kanpur, India (1203-65-36943)

1:15PM  
► (386.2) *Investigation of Difference Scheme for One Nonlinear Parabolic Equation*  
**Dr. Mikheil Tutberidze, PhD**<sup>\*</sup>, San Diego State University (1203-65-45526)

1:30PM  
♦ (386.3) *Adaptation of a variant of finite element method for the evolution equation in nonconvex domain*  
**Anjaly Anand**<sup>\*</sup>, Research Scholar, Department of Mathematics, National Institute of Technology Calicut, Kozhikode, Kerala, India.

Pincode-673601 and **Dr. Tamal Pramanick**, Assistant Professor, Department of Mathematics, National Institute of Technology Calicut, Kozhikode, Kerala, India. Pincode-673601 (1203-65-38507)

1:45PM  
▶ (386.4) *Galerkin Residual Correction with Compact Finite Difference Methods for 1-D Second Order Wave Equations*

**Md Shafiqul Islam**<sup>\*</sup>, Department of Applied Mathematics, University of Dhaka, Dhaka-1000, Bangladesh and **Mahmud Hasan**, Department of Applied Mathematics, University of Dhaka, Dhaka-1000, Bangladesh (1203-65-37940)

2:00PM  
▶ (386.5) *Numerical solution of two-dimensional Schrödinger equation using polynomial particular solutions*

**Thir Raj Dangal**<sup>\*</sup>, Augusta University, Augusta, GA 30912 (1203-65-43633)

2:15PM  
▶ (386.6) *A Novel Iterative Discretization Method for Solving Nonlinear Partial Differential Equations*

**Mohamed Ben Romdhane**<sup>\*</sup>, Abdullah Al Salem University, Kuwait and **Helmi Temimi**, Abdullah Al Salem University, Kuwait (1203-65-38009)

2:30PM  
▶ ♦ (386.7) *Spatial Transcriptomics Learned Non-negative Matrix Factorization (STL NMF)*

**Grant Konkel**<sup>\*</sup>, Case Western Reserve University and **Weihong Guo**, Case Western Reserve University (1203-65-44429)

2:45PM  
▶ (386.8) *Input Layer Regularization and hyperparameter selection for inverse problems in magnetic resonance*

**Shashank Sule**<sup>\*</sup>, University of Maryland, **Richard G Spencer**, National Institute on Aging, National Institutes of Health, **Wojciech Czaja**, University of Maryland, **Michael Rozowski**, University of Maryland, College Park and **Mirage Modi**, National Institute on Aging, National Institutes of Health (1203-65-44803)

3:00PM  
▶ (386.9) *Phase-Field Models for Computer Vision*

**Melissa De Jesus**<sup>\*</sup>, Florida International University (1203-65-45097)

**(387) AMS Contributed Paper Session on Operations Research, Game Theory, Economics, Information and Control**

**SATURDAY, JANUARY 11 1:00PM-5:15PM 306, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizer: **Brian D. Boe**, University of Georgia

1:00PM  
▶ ♦ (387.1) *Computing Scalar and Set-Based Regret of First-Order Algorithms for Online Multiobjective Optimization*

**Kristen Savary**<sup>\*</sup>, Clemson University, Edfinity and **Margaret M. Wiecek**, Clemson University (1203-90-41644)

1:15PM  
♦ (387.2) *A Generalization of Gini Simpson index under Fuzzy Environment*

**Dr. Gurcharan Singh Buttar, PhD**<sup>\*</sup>, Department of Mathematics, Western Community College (1203-90-42269)

1:30PM  
▶ (387.3) *Solving hard knapsack problems using general-purpose integer programming software*

**Yun Lu**<sup>\*</sup>, Kutztown University, **Francis Vasko**, Kutztown University and **Myung Soon Song**, Kutztown University (1203-90-42820)

1:45PM  
▶ (387.4) *Satellite Feature Recognition with 3D Gaussian Splatting-Based Object Detection Ensembles*

**Emma Rose Sandidge**<sup>\*</sup>, Florida Institute of Technology, Florida International University, **Van Minh Nguyen**, Florida Institute of Technology, **Trupti Mahendrakar**, Florida Institute of Technology and **Ryan T White**, Florida Institute of Technology (1203-90-44500)

2:00PM  
(387.5) *An integrated supply chain model for deteriorating inventory incorporating imperfections in production and quality inspection errors*

**Debojyoti Ghosh**<sup>\*</sup>, Department of Mathematics, Indian Institute of Technology Kharagpur, **Chayanika Rout**, Centre for Data Science, Institute of Technical Education and Research, Siksha 'O' Anusandhan (Deemed to be university), Bhubaneswar and **Adrijit Goswami**, Department of Mathematics, Indian Institute of Technology Kharagpur (1203-90-43576)

2:15PM  
(387.6) *Solution Existence of Quadratically Constrained Quadratic Programs, Preliminary Report*

**Alexander Joyce**<sup>\*</sup>, Florida Polytechnic University and **Boshi Yang**, Clemson University (1203-90-40277)

2:30PM  
*Break*

2:45PM  
▶ (387.8) *A Better Implementation of Circuit Augmentation*

**Angela Rose Morrison**<sup>\*</sup>, University of Colorado Denver and **Steffen Borgwardt**, University of Colorado Denver (1203-90-41728)

3:00PM  
▶ ♦ (387.9) *Multiple trust-region based Bayesian optimization*

**Sourav Das**<sup>\*</sup>, Indian Institute of Technology, Kharagpur, **Debjani Chakraborty**, Indian Institute of Technology, Kharagpur and **Pabitra Mitra**, Indian Institute of Technology, Kharagpur (1203-90-43344)

3:15PM  
▶ (387.10) *The Evolution of Learning in Social Dilemmas*

**Brian Mintz**<sup>\*</sup>, Dartmouth College and **Feng Fu**, Dartmouth College (1203-91-41989)

3:30PM  
▶ (387.11) *CANCELLED Combinatorial models for the game of best choice*

**Brant C. Jones**<sup>\*</sup>, James Madison University (1203-91-43859)

3:45PM  
(387.12) *Artificial prediction markets present a novel opportunity for human-AI collaboration*

**Sarah Rajtmajer**<sup>\*</sup>, The Pennsylvania State University, **Sai Koneru**, The Pennsylvania State

University, **Tatiana Chakravorti**, The Pennsylvania State University, **Robert Fraleigh**, The Pennsylvania State University, **Michael McLaughlin**, The Pennsylvania State University, **Christopher Griffin**, The Pennsylvania State University, **Anthony Kwasnica**, Florida State University, **David Pennock**, Rutgers University, **Timothy Fritton**, The Pennsylvania State University and **C. Lee Giles**, The Pennsylvania State University (1203-91-37334)

4:00PM *Information Capacity for Time-Varying Networks*  
▶ (387.13)

**Daniel P. Bossaller**, University of Alabama in Huntsville and **Raphael S. Thorp**, University of Alabama in Huntsville (1203-94-44204)

4:15PM *Efficiency of Biologically Plausible Neuron Models via Transfer Entropy*  
▶ (387.14)

**Declan McGurk**, University of West Florida and **Dylan Wright**, University of West Florida (1203-94-44502)

4:30PM *Phase transition from consensus to polarization in opinion formation*  
▶ ◆ (387.15)

**Vince Nicolas Salas Campo**, Arizona State University, **Sebastien Motsch**, Arizona State University and **Dylan Weber**, Changing Character of War Centre, Pembroke College, University of Oxford; Artis International (1203-91-44604)

4:45PM *A Construction of Optimal Quasi-cyclic Locally Recoverable Codes using Constituent Codes*  
◆ (387.16)

**Angelynn R Alvarez**, Embry-Riddle Aeronautical University, **Gustavo Terra Bastos**, Federal University of São João del-Rei, **Zachary Joseph Flores**, Two Six Technologies and **Adriana Salerno**, Bates College (1203-94-38216)

5:00PM *CANCELLED Dyadic matrices in quantum error-correction*  
▶ (387.17)

**Tefjol Pllaha**, University of South Florida (1203-94-45114)

### ***(388) AMS Contributed Paper Session on Ordinary Differential Equations***

SATURDAY, JANUARY 11 1:00PM–3:45PM 302, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

1:00PM *Bistability in a model of hepatitis B virus dynamics*  
▶ (388.1)

**Nazia Afrin**, University of Louisiana at Lafayette (1203-34-45734)

1:15PM *Analyzing Mortar Baseplate Movement Using Differential Equations*  
▶ (388.2)

**Alexander Hoan Le**, United States Air Force Academy (1203-34-38131)

1:30PM *On the Long-time Behavior of Solutions of a Hadamard-Type Fractional Differential Problem with a Convolution Kernel*  
▶ (388.3)

**Ahmed Mahdi Moqbel Ahmed**, King Fahd University of Petroleum & Minerals (1203-34-39515)

1:45PM *FOREX Prediction Using Deep Learning*  
▶ (388.4) **Hari Prasad Sitaula**, Montana Technological University, **Sundar Tamang**, Western New Mexico University, **Hum Nath Bhandari**, Roger Williams University, **Ramchandra Rimal**, Middle Tennessee State University and **Binod Rimal**, The University of Tampa (1203-34-43462)

2:00PM *Differential Equations Model for Stock Pricing*  
▶ (388.5) **Sundar Tamang**, Western New Mexico University (1203-34-43629)

2:15PM *On Existence-Uniqueness of Initial Value Problem for Caputo-Fabrizio Fractional Differential Equation*  
▶ (388.6) **Anindita Ojha**, IIT Kharagpur (1203-34-44436)

2:30PM *Learning Gaussian Multi-Index Models with Gradient Flow: Time Complexity and Directional Convergence*  
▶ ◆ (388.7)

**Dr. Berfin Simsek, PhD**, Flatiron Institute & NYU, **Amire Bendjeddou**, EPFL and **Daniel Joseph Hsu**, Columbia (1203-34-45293)

2:45PM *Bifurcation studies of nonlinear LC circuit containing Josephson junction*  
(388.8) **Shubham Garg**, Indian Institute of Technology Jodhpur and **Kirankumar R. Hiremath**, Indian Institute of Technology Jodhpur (1203-34-41586)

3:00PM *On the rate of convergence of solutions to some second order differential equations*  
▶ (388.9) **Behzad Djafari-Rouhani**, UTEP (1203-34-44196)

3:15PM *Understanding the Global Dynamics of ESBL-Producing E. coli Spread Using a Stochastic Model: Implications for Public Health and Antimicrobial Resistance Control*  
▶ (388.10) **Arash Arjmand**, University of Missouri Kansas City (1203-34-45620)

### ***(389) AMS Contributed Paper Session on Professional Development and Wider Issues, II***

SATURDAY, JANUARY 11 1:00PM–4:15PM 308, Level Three, Seattle Convention Center Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

1:00PM *Grading is Pointless: A New Equitable Grading Paradigm*  
▶ (389.1)

**Stuart F Boersma**, Central Washington University (1203-104-44594)

1:15PM *Mathposium: A Student-led Conference and Mentoring Initiative*  
▶ ◆ (389.2)

**Darsh Gandhi**, University of Texas at Arlington, **Talon Johnson**, University of Texas Southwestern Medical Center, University of Texas at Arlington and **Theresa Jorgensen**, University of Texas at Arlington (1203-104-40109)

1:30PM  
▶ ◆  
(389.3) *Kean University's NSF Noyce CREST: Expanding the Tomorrow's Teachers Program*  
**Louis M Beaugris**<sup>\*</sup>, Kean University, **Laura Lorentzen**, Kean University, **Gail Verdi**, Kean University and **Patricia McDermitt**, Kean University (1203-104-45278)

1:45PM  
▶ ◆  
(389.4) *CANCELLED Mathematics of the Pacific*  
**Kamuela E. Yong**<sup>\*</sup>, University of Hawaii West Oahu (1203-104-40974)

2:00PM  
▶ (389.5) *Panel Discussion of the Session on Epidemic Modeling: Current Status and Future Directions*  
**Leigh Metcalf**<sup>\*</sup>, Carnegie Mellon University (1203-104-42958)

2:15PM  
▶ (389.6) *CANCELLED Quantification and Epistemic Authority in AI Safety*  
**Shazeda Ahmed**<sup>\*</sup>, UCLA (1203-104-45595)

2:30PM  
▶ (389.7) *Mathematics, Sustainability, AI - Combination or Intersection*  
**Eileen L Poiani**<sup>\*</sup>, Saint Peter's University, Jersey City, New Jersey (1203-104-44226)

2:45PM  
▶ (389.8) *Teaching Mathematics in a Disconnected World*  
**Ioana Mihaila**<sup>\*</sup>, Cal Poly Pomona (1203-104-40437)

3:00PM  
▶ (389.9) *Cultural Exchange and Academic Collaboration: Reflections on My Fulbright Experience in Portugal*  
**Mahir Bilen Can**<sup>\*</sup>, Tulane University (1203-104-42701)

3:15PM  
▶ ◆  
(389.10) *CANCELLED Creating accessible mathematical diagrams*  
**David M Austin**<sup>\*</sup>, Grand Valley State University (1203-104-41098)

3:30PM  
▶ (389.11) *Professional Development and Fulbright Award Impact*  
**Derya G Akleman**<sup>\*</sup>, Texas A&M University (1203-104-42852)

3:45PM  
▶ (389.12) *CANCELLED Fulbright Experience in Chile*  
**Susanna Dodds Fishel**<sup>\*</sup>, Arizona State University (1203-104-43864)

4:00PM  
▶ (389.13) *Learning to eat soup with my hands: Fulbright on Matroids, Building Communities, and Connecting Far Corners of the World*  
**Nancy Ann Neudauer**<sup>\*</sup>, Pacific University (1203-104-45350)

### *(390) AMS Contributed Paper Session on Statistics, II*

SATURDAY, JANUARY 11 1:00PM-4:30PM 307, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizer: **Brian D. Boe**, University of Georgia

1:00PM  
▶ ◆  
(390.1) *Identification of patients with stable coronary artery disease who benefit from ACE inhibitors using Cox mixture model for heterogeneous treatment effects*  
**Hai Van Le**<sup>\*</sup>, University of Washington (1203-62-39556)

1:15PM  
(390.2) *Machine Learning techniques using in Survival Analysis for time to event data*  
**Durga Hari Kutal**<sup>\*</sup>, Augusta University (1203-62-44696)

1:30PM  
▶ ◆  
(390.3) *A Review of Bath-tub shaped Hazard Rate Distributions*  
**Sudakshina Singha Roy**<sup>\*</sup>, University of West Florida (1203-62-41351)

1:45PM  
▶ ◆  
(390.4) *CBOE Volatility Index and Options Trading Strategies*  
**Praise Jesujoba Alayode**<sup>\*</sup>, Coppin State University, **Matthew J Mione**, University of Miami (FL), **Benjamin Shinkichi Shimabukuro**, Massachusetts Institute of Technology, **Vladmir Necula**, Lafayette College and **Mori Schacter**, Emory University (1203-62-37730)

2:00PM  
(390.5) *The Impact of the Introduction of Bitcoin Exchange Traded Products (ETPs) on Bitcoin Liquidity*  
**Kali Prasun Chowdhury**<sup>\*</sup>, U.S. Securities and Exchange Commission (1203-62-45892)

2:15PM  
(390.6) *A Bayesian Online Spatio-Temporal Detection Framework with Likelihood Weight Smoothing for Disease Surveillance*  
**Lakmini Nadeesha Jayaweera Imiya Mohottige**<sup>\*</sup>, University of Akron (1203-62-44265)

2:30PM  
▶ (390.7) *A Novel Approach for Efficient Multi-class Anxiety Level Prediction Approximation for Long Assessments*  
**Haochong Yang**<sup>\*</sup>, University of Toronto (1203-62-39583)

2:45PM  
▶ (390.8) *Study of Asset Returns Behavior for Predictive Modeling*  
**Netra Khanal**<sup>\*</sup>, The University of Tampa, **Gokarna Aryal**, Purdue University Northwest and **Jayanta Pokharel**, Siena College (1203-62-44781)

3:00PM  
▶ ◆  
(390.9) *Using Machine Learning and Regression Methods to Predict Mathematical Performance of Collegiate Students based on their Math Anxiety.*

**Dipesh Baral**<sup>\*</sup>, Washington State University, Pullman, **Nairanjana Dasgupta**, Washington State University, Pullman and **Laura McLeman**, University of Michigan-Flint (1203-62-45429)

3:15PM  
▶ (390.10) *Reparameterization of Poisson Distribution and Applications*  
**Mingfang Huang**<sup>\*</sup>, Graduate student, Colorado State University (1203-62-38941)

3:30PM  
▶ ◆  
(390.11) *Development of a Machine Learning-Based Predictive Modeling Framework for Molten Salt Reactor Sensor Data Analysis*  
**Omobolade A Odedoyin**<sup>\*</sup>, Johns Hopkins University, Idaho National Laboratory, **Ramon K Yoshiura**, Idaho National Laboratory, **Guoping Cao**, Idaho National Laboratory, **Toni Y Karlsson**, Idaho National Laboratory, **Takanori Kajihara**, Idaho National Laboratory, **Dylan J McDowell**, Idaho National Laboratory

and **Aditya Moudgal**, Idaho National Laboratory (1203-62-40255)

- 3:45PM  
▶ (390.12) *Uncertainty-Adjusted Decay Functions for Dynamic Scoring in Cyber Threat Intelligence Preliminary Report*  
**Linda C Beverly**<sup>\*</sup>, Cyber Threat Alliance (1203-62-43428)
- 4:00PM  
(390.13) *Outwitting outliers: A framework for computing persistence diagrams under adversarial contamination*  
**Siddharth Vishwanath**<sup>\*</sup>, University of California, San Diego (1203-62-44461)

**(391) AMS Special Session on Applications of Algebraic Geometry, II**

SATURDAY, JANUARY 11 1:00PM–6:00PM 605, Level Six,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **Taylor Brysiewicz**, University of Western Ontario

**Jessie Loucks-Tavitas**, University of Washington

**Frank Sottile**, Texas A&M University

**Timothy Duff**, Georgia Tech

- 1:00PM  
▶ (391.1) *Computation of Schubert Galois Groups*  
**Christopher J Bott**<sup>\*</sup>, Texas A&M University (1203-14-43548)
- 1:30PM  
(391.2) *Generalized real monodromy*  
**Margaret Regan**<sup>\*</sup>, College of the Holy Cross and **Timothy Duff**, University of Missouri (1203-14-43346)
- 2:00PM  
▶ (391.3) *Non-defectivity of moment varieties and identifiability of mixture distributions*  
**Oskar Henriksson**, University of Copenhagen, **Kristian Ranestad**, University of Oslo, **Lisa Seccia**, University of Neuchâtel and **Teresa Yu**<sup>\*</sup>, University of Michigan (1203-14-41122)
- 2:30PM  
▶ ◆ (391.4) *Toric compactifications of periodic graph operators*  
**Matthew H Faust**, Michigan State University, **Jordy Lopez Garcia**<sup>\*</sup>, Texas A&M University and **Frank Sottile**, Texas A&M University (1203-14-41520)
- 3:00PM  
▶ (391.5) *On the typical and atypical solutions to the Kuramoto equations*  
**Julia Lindberg**<sup>\*</sup>, University of Texas-Austin (1203-14-41607)
- 3:30PM  
◆ (391.6) *The geometry of economic fragility to characterize phase transitions for supply chain shocks*  
**Jose Israel Rodriguez**<sup>\*</sup>, University of Wisconsin Madison and **Jiayi Li**, University of California, Los Angeles (1203-62-39497)
- 4:00PM  
(391.7) *Critical Curvature of Algebraic Varieties*  
**Madeleine Weinstein**<sup>\*</sup>, University of Puget Sound, **Madeline Brandt**, Vanderbilt University, **Kristian Ranestad**, University of Oslo and **Paul Breiding**, Universität Osnabrueck (1203-14-42841)

- 4:30PM  
▶ ◆ (391.8) *Homaloidal Polynomials and Gaussian Models of Maximum Likelihood Degree One*  
**Pardis Semnani**<sup>\*</sup>, The University of British Columbia (1203-14-44021)
- 5:00PM  
▶ (391.9) *Certified simultaneous isotopic approximation of curves via subdivision*  
**Michael Byrd**<sup>\*</sup>, Clemson University and **Michael Burr**, Clemson University (1203-14-43122)
- 5:30PM  
(391.10) *Certified homotopy tracking*  
**Kisun Lee**<sup>\*</sup>, Clemson University (1203-14-44299)

**(392) AMS Special Session on Approximate Models of Fluid Motion, II**

SATURDAY, JANUARY 11 1:00PM–6:00PM 310, Level Three,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **John D Carter**, Seattle University

**Anastasiya Semenova**, University of Washington

- 1:00PM  
(392.1) *Asymmetric capillary-gravity water waves in the steady periodic setting*  
**Mats Ehrnstrom**<sup>\*</sup>, NTNU Norwegian University of Science and Technology (1203-76-44510)
- 1:30PM  
(392.2) *Vacuum dam break in repulsive Bose-Einstein condensates*  
**Patrick Sprenger**<sup>\*</sup>, University of California Merced (1203-35-43766)
- 2:00PM  
▶ (392.3) *Benjamin-Feir instability for generalized Korteweg-de Vries equations*  
**Antonio Milosh Radakovic**<sup>\*</sup>, SISSA (1203-35-42622)
- 2:30PM  
(392.4) *The Benjamin-Feir instability in KdV-like equations with general dispersion and monomial nonlinearity*  
**Bhavna Kaushik**<sup>\*</sup>, IIT Delhi, **Bernard Deconinck**, University of Washington and **Ashish Kumar Pandey**, IIT Delhi (1203-35-43230)
- 3:00PM  
(392.5) *Modulational Instability in the Ostrovsky Equation*  
**Mathew A. Johnson**<sup>\*</sup>, University of Kansas (1203-35-43509)
- 3:30PM  
▶ (392.6) *Instabilities of small-amplitude periodic traveling waves in a shallow water model*  
**Ashish Kumar Pandey**<sup>\*</sup>, IIT Delhi (1203-35-43612)
- 4:00PM  
▶ (392.7) *Resonant wave-wave interactions via phase-plane analysis: introduction to a useful tool and a survey of some recent results*  
**Raphael Stuhlmeier**<sup>\*</sup>, University of Plymouth, UK (1203-76-43317)
- 4:30PM  
(392.8) *Embedded Solitary Waves in the Euler equations: three-layer stratified flows*  
**Paul Milewski**<sup>\*</sup>, Penn State, **Alex Doak**, University of Bath and **Ricardo Barros**, Loughborough University (1203-76-40074)

5:00PM *Exact pole dynamics solutions to the generalized Constantin-Lax-Majda equation with dissipation*  
 ▶ (392.9) **Michael Siegel**<sup>\*</sup>, NJIT, **David M. Ambrose**, Drexel University, **Pavel M Lushnikov**, Department of Mathematics and Statistics and **Denis Silant'ev**, University of Colorado (1203-76-44166)

5:30PM *Ripples and Resonance in Weakly Nonlinear Models*  
 ▶ (392.10) **Benjamin Akers**<sup>\*</sup>, Air Force Institute of Technology (1203-35-39283)

**(393) AMS Special Session on Combinatorial and Probabilistic Methods in Group Theory, II**

**SATURDAY, JANUARY 11 1:00PM–6:00PM Tahoma 2, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Gil Goffer**, University of California at San Diego  
**Tianyi Zheng**, University of California San Diego  
**Be"eri Greenfeld**, University of Washington

1:00PM *Geometric finiteness in mapping class groups: examples and perspectives*  
 (393.1) **Spencer Dowdall**<sup>\*</sup>, Vanderbilt (1203-20-42985)

2:00PM *Piecewise isometry groups arising from Weyl groups*  
 ▶ (393.2) **Robert Bieri**, Binghamton University, Goethe University Frankfurt, **Alex Jay Feingold**, Binghamton University State University of New York and **Daniel Studenmund**<sup>\*</sup>, Binghamton University (1203-20-43473)

3:00PM *Automorphism Groups of Shifts of Low Complexity*  
 ▶ (393.3) **Joshua Frisch**<sup>\*</sup>, University of California San Diego (1203-37-45427)

4:00PM *Stochastic Embeddings of Metric Spaces and Group Actions on  $\mathbb{S}^1$*   
 (393.4) **Chris Gartland**<sup>\*</sup>, University of California San Diego (1203-20-42650)

4:30PM *Groups with arbitrarily large stability radius growth*  
 (393.5) **Itamar Vigdorovich**<sup>\*</sup>, University of California San Diego (1203-20-40736)

5:00PM *Monodromy groups of covers of genus 1 Riemann surfaces*  
 (393.6) **Eilidh McKemmie**<sup>\*</sup>, Kean University, **Danny Neftin**, Technion and **Spencer Gerhardt**, University of Southern California (1203-20-42130)

5:30PM *Connected components in Morse boundaries of right-angled Coxeter groups*  
 (393.7) **Annette Ulrike Karrer**<sup>\*</sup>, Ohio State University (1203-20-43533)

**(394) AMS Special Session on Combinatorics and Graph Theory in Honor of Dr. Peter Johnson, II**

**SATURDAY, JANUARY 11 1:00PM–6:00PM Tahoma 4, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Fadekemi Janet Osaye**, Alabama State University

**Michael Tait**, Villanova University

**Alex Somto Arinze Alochukwu**, DSI-NRF Centre of Excellence in Mathematical and Statistical Sciences, University of the Witwatersrand, Johannesburg

1:00PM *Avoiding  $k$ -Rainbow Graphs in Edge Colorings of  $\mathcal{K}_n$*   
 (394.1) **Isabel Harris**<sup>\*</sup>, Rice University (1203-05-41592)

1:30PM *Word representations and representation numbers of graphs*  
 (394.2) **Zion Hefty**, University of Denver, **Paul Horn**<sup>\*</sup>, University of Denver, **Colby Muir**, Auburn University and **Andrew Owens**, Widener University (1203-05-44227)

2:00PM *Counterexamples to a Conjecture on Hall Ratio*  
 (394.3) **Adam Blumenthal**<sup>\*</sup>, Westminster College, **Bernard Lidicky**, Iowa State University, **Ryan R. Martin**, Iowa State University, **Sergey Norin**, Department of Mathematics and Statistics, McGill University, **Florian Pfender**, University of Colorado Denver and **Jan Volec**, Czech Technical University (1203-05-42343)

2:30PM *The oriented diameter of complements and line graphs*  
 ▶ (394.4) **Peter Dankelmann**<sup>\*</sup>, University of Johannesburg, **Yubao Guo**, RWTH Aachen University, **Emily Rivett-Carnac**, University of Johannesburg and **Lutz Volkmann**, RWTH Aachen University (1203-05-41570)

3:00PM *Break*

3:30PM *On the Wiener Index of Graphs with Given Maximum Degree*  
 ◆ (394.6) **Sonwabile Mafunda**<sup>\*</sup>, Soka University of America (1203-05-44888)

4:00PM *Symmetry Breaking in Graphs*  
 ▶ (394.7) **Katherine Perry**<sup>\*</sup>, Soka University of America (1203-05-39079)

4:30PM *Linear arboricity of graphs with large minimum degree*  
 ▶ (394.8) **Songling Shan**<sup>\*</sup>, Auburn University and **Yuping Gao**, Lanzhou University (1203-05-40089)

5:00PM *Avoiding  $k$ -rainbow subgraphs in edge colorings of  $K_n$*   
 ▶ (394.9) **Peter D. Johnson**<sup>\*</sup>, Auburn University (1203-05-41978)

**(395) AMS Special Session on Concordance and Cobordism in Low Dimensions, II**

**SATURDAY, JANUARY 11 1:00PM–6:00PM 620, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Abhishek Mallick**, Rutgers University

- Maggie Miller**, Clay Mathematics Institute  
**Ryan Stees**, Indiana University
- 1:00PM (395.1) *Fibered, homotopy-ribbon disks*  
**Jeffrey Meier**<sup>\*</sup>, Western Washington University and **Alexander Zupan**, University of Nebraska-Lincoln (1203-57-42492)
- 1:30PM ▶ (395.2) *Positive Knots and Ribbon Concordance Minimality*  
**Joseph Boninger**<sup>\*</sup>, Boston College (1203-57-41945)
- 2:00PM (395.3) *Non-Orientable Surfaces Bounded by Knots and the Knot Trace*  
**Megan Kristine Fairchild**<sup>\*</sup>, Louisiana State University (1203-57-41780)
- 2:30PM ▶ (395.4) *Chi-sliceness of pretzel links*  
**Weizhe Shen**<sup>\*</sup>, Georgia Institute of Technology, **Sophia Fanelle**, Boston College, **Evan Huang**, Princeton University, **Ben Huenemann**, University of Nebraska-Lincoln, **Jonathan Simone**, Georgia Tech and **Hannah Turner**, Stockton University (1203-57-42335)
- 3:00PM ◆ (395.5) *Corks for exotic diffeomorphisms*  
**Vyacheslav Krushkal**, University of Virginia, **Anubhav Mukherjee**, Princeton, **Mark Powell**, University of Glasgow and **Terrin Warren**<sup>\*</sup>, California Polytechnic State University (1203-57-41711)
- 3:30PM *Break*
- 4:00PM (395.7) *Rational homology spheres and  $SL(2, \mathbb{C})$  representations*  
**Sudipta Ghosh**<sup>\*</sup>, Notre Dame (1203-57-42129)
- 4:30PM (395.8) *Higher-dimensional Heegaard Floer wrapped Fukaya Category of Cotangent Bundles*  
**Roman Krutowski**<sup>\*</sup>, UCLA, **Ko Honda**, UCLA, **Tianyu Yuan**, Beijing International Center for Mathematical Research and **Yin Tian**, Beijing Normal University (1203-53-42831)
- 5:00PM (395.9) *Contact invariant, Cobordism naturality and application*  
**Shunyu Wan**<sup>\*</sup>, University of Virginia (1203-57-41554)
- 5:30PM ◆ (395.10) *Bridge multisections for symplectic surfaces in Weinstein 4-manifolds*  
**Melissa Zhang**<sup>\*</sup>, University of California, Davis, **Román Aranda**, University of Nebraska-Lincoln, **Patricia Cahn**, Smith College, **Marion Campisi**, San Jose State University and **Agniva Roy**, Georgia Institute of Technology (1203-57-42617)

**(396) AMS Special Session on Cryptography and Related Fields, II**

SATURDAY, JANUARY 11 1:00PM–6:00PM Skagit 2, Lower Level, Seattle Convention Center Arch at 800 Pike

Organizers: **Max Cartor**, University of Louisville  
**Angela Robinson**, NIST  
**Ryann Cartor**, Clemson University

- 1:00PM (396.1) *Isogeny Interpolation in Cryptography*  
**David Y Jao**<sup>\*</sup>, University of Waterloo (1203-94-45360)
- 2:00PM (396.2) *Isogeny graphs and the security of isogeny-based cryptography*  
**Sarah Arpin**<sup>\*</sup>, Virginia Polytechnic Institute and State University (1203-11-43537)
- 2:30PM ▶ (396.3) *Advanced Cryptographic Constructions From Isogenies, Quaternions and the Deuring Correspondence*  
**Giacomo Borin**<sup>\*</sup>, IBM Research Zurich, University of Zurich (1203-14-42530)
- 3:00PM ▶ (396.4) *A Post-Quantum Mercurial Signature Scheme*  
**Madison Mabe**<sup>\*</sup>, Clemson University, **Ryann Cartor**, Clemson University, **Antsa Rakotondrafara**, Clemson University, **Micah Brody**, Bradley University and **Sheny Perez**, Xavier University (1203-94-44994)
- 3:30PM ▶ ◆ (396.5) *MAYO: Practical Post-Quantum Signatures and Advanced Constructions*  
**Sofia Celi**<sup>\*</sup>, Brave (1203-15-44004)
- 4:00PM (396.6) *Post-Quantum Blind Signatures from Code Equivalence*  
**Veronika Kuchta**, Florida Atlantic University, **Jason LeGrow**<sup>\*</sup>, Virginia Tech and **Edoardo Persichetti**, Florida Atlantic University (1203-94-43667)
- 4:30PM ▶ (396.7) *CROSS: A Signature Scheme with Restricted Errors*  
**Violetta Weger**<sup>\*</sup>, Technical University of Munich (1203-94-40877)
- 5:00PM ▶ (396.8) *Modeling the Syndrome Decoding Problems as a System of Multivariate Equations*  
**Alessio Caminata**<sup>\*</sup>, Università Di Genova (1203-13-42795)
- 5:30PM (396.9) *Improved Cryptanalysis of HFERP*  
**Max Cartor**<sup>\*</sup>, University of Louisville (1203-94-45151)

**(397) AMS Special Session on Current Directions on Modular Forms: in Twenty Minutes Snippets, III**

SATURDAY, JANUARY 11 1:00PM–6:00PM 606, Level Six, Seattle Convention Center Arch at 705 Pike

Organizers: **Olivia Beckwith**, University of Illinois Urbana-Champaign  
**Kalani Thalagoda**, Tulane University  
**Victor H Moll**, Tulane University

- 1:00PM ▶ (397.1) *Zeros of partition-theoretic polynomials*  
**Walter Bridges**, University of Cologne, **William Craig**, US Naval Academy, **Amanda Folsom**, Amherst College and **Larry Rolin**<sup>\*</sup>, Vanderbilt University (1203-11-43898)
- 1:30PM ◆ (397.2) *Automorphic Form Twisted Adelic Shintani Zeta Functions*  
**Eun Hye Lee**<sup>\*</sup>, Texas Christian University and **Ramin Takloo-Bighash**, University of Illinois At Chicago (1203-11-41206)

- 2:00PM  
◆ (397.3) *Effective correlation and decorrelation for newforms, and weak subconvexity for  $SL_2$ -functions*  
**Nawapan Wattanawanichkul**<sup>\*</sup>, University of Illinois Urbana-Champaign (1203-11-37199)
- 2:30PM  
◆ (397.4) *Large Sums of Divisor-Bounded Multiplicative Functions*  
**Claire Frechette**<sup>\*</sup>, Boston College, **Mathilde Gerbelli-Gauthier**<sup>\*</sup>, Institute for Advanced Stud, **Alia Hamieh**<sup>\*</sup>, University of Nothern British Columbia and **Naomi Tanabe**<sup>\*</sup>, Bowdoin College (1203-11-44893)
- 3:00PM  
(397.5) *Self-Correlations of Hurwitz Class Numbers*  
**Alexander Weston Walker**<sup>\*</sup>, University College London (1203-11-43430)
- 3:30PM  
▶ (397.6) *Zeros of period polynomials for symmetric power  $L$ -functions*  
**Robert Dicks**<sup>\*</sup>, Clemson University (1203-11-42771)
- 4:00PM  
(397.7) *Summation formulas attached to a class of arithmetical functions*  
**Rajat Gupta**<sup>\*</sup>, University of Maine, USA (1203-11-45377)
- 4:30PM  
(397.8) *Holomorphic projection of Sesquiharmonic Maass forms*  
**Vaishavi Sharma**<sup>\*</sup>, The Ohio State University, **Michael Allen**<sup>\*</sup>, Louisiana State University and **Olivia Beckwith**<sup>\*</sup>, Tulane University (1203-11-44725)
- 5:00PM  
▶ (397.9) *On Rankin-Cohen-type brackets of three or more modular forms*  
**Andrei Mandelshtam**<sup>\*</sup>, Stanford University and **Shaul Zemel**<sup>\*</sup>, Author (1203-11-45185)

**(398) AMS Special Session on Ecological and Evolutionary Models in Biology and Epidemiology, II**

**SATURDAY, JANUARY 11 1:00PM–5:30PM Skagit 5, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **Yun Kang**, Arizona State University  
**Sabrina H Streipert**, University of Pittsburgh  
**Yanyu Xiao**, University of Cincinnati

- 1:00PM  
(398.1) *Biological aggregations from spatial memory and nonlocal advection*  
**Junping Shi**<sup>\*</sup>, College of William & Mary, **Di Liu**<sup>\*</sup>, Hangzhou Normal University, **Jonathan Potts**<sup>\*</sup>, University of Sheffield, **Yurij Salmaniw**<sup>\*</sup>, Oxford University and **Hao Wang**<sup>\*</sup>, University of Alberta (1203-92-40911)
- 1:30PM  
(398.2) *Exhaustive stochastic search under stochastic resetting*  
**Samantha Linn**<sup>\*</sup>, University of Utah (1203-60-40950)
- 2:00PM  
(398.3) *Superspreading transmission events in stochastic epidemic models*  
**Xueying Wang**<sup>\*</sup>, Washington State University (1203-60-41567)

- 2:30PM  
▶ (398.4) *Evolutionary Discrete Models Global Dynamics*  
**Saber Elaydi**<sup>\*</sup>, Trinity University (1203-92-41828)
- 3:00PM  
▶ (398.5) *Insights into HPV vaccination from modeling studies*  
**Libin Rong**<sup>\*</sup>, University of Florida (1203-92-44351)
- 3:30PM  
▶ (398.6) *Mosquito populations and dengue transmission under climate variation: Mathematical Models and Math-model Informed Neural Networks (MINN)*  
**Naveen K. Vaidya**<sup>\*</sup>, San Diego State University (1203-92-44786)
- 4:00PM  
▶ ◆ (398.7) *Model of regulation of plant secondary metabolite intake by an herbivore through feedback from blood toxin level*  
**Thomas Dean**<sup>\*</sup>, University of Wyoming, **Don DeAngelis**<sup>\*</sup>, University of Miami, **Jen Forbey**<sup>\*</sup>, Boise State University and **Rongsong Liu**<sup>\*</sup>, University of Wyoming (1203-92-43542)
- 4:30PM  
▶ (398.8) *Adaptive Changes in Sexual Behavior in the High-Risk Population in Response to Human Monkeypox Transmission Can Control the Outbreak: Insights from a Two-Group, Two-Route Epidemic Model*  
**Jude Kong**<sup>\*</sup>, University of Toronto, **Nicola Bragazzi**<sup>\*</sup>, Department of Food and Drugs, University of Parma, **Qing Han**<sup>\*</sup>, Africa-Canada Artificial Intelligence and Data Innovation Consortium (ACADIC), York University and **Woldegebriel Assefa Woldegerima**<sup>\*</sup>, Laboratory for Industrial & Applied Mathematics, Department of Mathematics & Statistics, York University, Canada (1203-92-46177)

- 5:00PM  
(398.9) *Evolution of Pathogen Tolerance in an Epidemic Model*  
**Sabrina H Streipert**<sup>\*</sup>, University of Pittsburgh and **David Swigon**<sup>\*</sup>, University of Pittsburgh (1203-92-44029)

**(399) AMS Special Session on Emerging Geometric and Topological Machine Learning Methods in Mathematical and Computational Oncology, I**

**SATURDAY, JANUARY 11 1:00PM–6:00PM 612, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Dhananjay Bhaskar**, Yale University  
**Aarthi Venkat**, Yale University  
**Raul Rabadan**, Columbia University  
**Shmuel Weinberger**, University of Chicago  
**Smita Krishnaswamy**, Yale

- 1:00PM  
▶ (399.1) *Cohomology classes in the RNA transcriptome*  
**Kelly Spry Maggs**<sup>\*</sup>, EPFL (1203-92-42774)
- 1:30PM  
▶ ◆ (399.2) *Combining topology and machine learning for spatial data from oncology*  
**Bernadette Stolz**<sup>\*</sup>, Max Planck Institute of Biochemistry, **Jagdeep Dhesi**<sup>\*</sup>, University of Cambridge, **Joshua Bull**<sup>\*</sup>, University of Oxford,

**Heather A Harrington**, University of Oxford, **Helen Byrne**, University of Oxford, **Iris H. R. Yoon**, Wesleyan University, **Jérémy Baffou**, EPFL, **Vaishnavi Subramanian**, EPFL and **Dorina Thanou**, EPFL (1203-92-44529)

- 2:00PM  
▶ (399.3) *Computational Modeling of Cell Migration in Tumor Microenvironments*  
**Ashlee N. Ford Versypt**<sup>\*</sup>, University at Buffalo, The State University of New York, **Kailei Liu**, University at Buffalo, The State University of New York, **Temitope O. Benson**, University at Buffalo, The State University of New York, **Mohammad A. Islam**, University at Buffalo, The State University of New York and **Michael B. Dwinell**, Medical College of Wisconsin (1203-92-42881)
- 2:30PM  
◆ (399.4) *Cycle structure dynamics in chromosome aberration multigraphs*  
**Radmila Sazdanovic**<sup>\*</sup>, NC State University (1203-55-45133)
- 3:00PM  
(399.5) *Flow matching with applications to single-cell dynamics*  
**Alexander Tong**<sup>\*</sup>, Mila; University of Montreal (1203-68-42117)
- 3:30PM  
▶ (399.6) *Inferring interpretable biological signals from single-cell genomics data using deep generative models*  
**Jiarui Ding**<sup>\*</sup>, UBC (1203-92-44345)
- 4:00PM  
▶ (399.7) *Optimal transport for treatment effect prediction*  
**Guillaume Huguet**<sup>\*</sup>, Université de Montréal; Mila (1203-92-44504)
- 4:30PM  
▶ (399.8) *Relational and multiparameter persistence with applications to oncology*  
**Heather A Harrington**<sup>\*</sup>, University of Oxford (1203-55-44417)
- 5:00PM  
▶ (399.9) *The Unreasonable Effectiveness of Mathematical AI in Biosciences*  
**Guowei Wei**<sup>\*</sup>, Michigan State University (1203-55-36809)
- 5:30PM  
▶ (399.10) *Topology of Artificial Neuron Activations in Deep Learning*  
**Bei Wang**<sup>\*</sup>, University of Utah (1203-55-45750)

**(400) AMS Special Session on Financial Mathematics, II**

**SATURDAY, JANUARY 11 1:00PM–4:00PM 205, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizer: **Sixian Jin**, Worcester Polytechnic Institute

- 1:00PM  
(400.1) *Risk-indifference Pricing of American-style Contingent Claims*  
**Rohini Kumar**, Wayne State University, **Frederick Isadore Miller**, Northeastern University, **Hussein Nasrallah**, University of Michigan-Dearborn and **Stephan Sturm**<sup>\*</sup>, Worcester Polytechnic Institute (1203-91-40359)

- 1:30PM  
(400.2) *Portfolio theory with monetary preferences*  
**Dilip Madan**, University of Maryland College Park and **Yoshihiro Shirai**<sup>\*</sup>, University of Washington (1203-91-43924)
- 2:00PM  
(400.3) *Moderate Deviation Principles for Stochastic Differential Equations in a Fast Markovian Environment*  
**Hongjiang Qian**<sup>\*</sup>, Auburn University (1203-60-43040)
- 2:30PM  
▶ (400.4) *Set Values of Dynamic Nonzero Sum Games and Set Valued Hamiltonians*  
**Bixing Qiao**<sup>\*</sup>, USC and **Jianfeng Zhang**, USC (1203-91-40024)
- 3:00PM  
▶ (400.5) *Wavelet Based Reinforcement Learning for Pairs Trading Across Multiple Asset Classes.*  
**Kevin Michael Wood**<sup>\*</sup>, Western Connecticut State University (1203-91-45119)
- 3:30PM  
▶ (400.6) *Hedging in Trinomial Option Pricing via a Perpetual Derivative*  
**Jagdish Gnawali**<sup>\*</sup>, Texas Tech University, **W. Brent Lindquist**, Texas Tech University and **Svetlozar Todorov Rachev**, Texas Tech University (1203-91-42628)

**(401) AMS Special Session on Generative AI for Improving Instructional Productivity, II**

**SATURDAY, JANUARY 11 1:00PM–4:30PM Chelan 5, Level 2, Seattle Convention Center Arch at 800 Pike**

Organizers: **Erich McAlister**, Fort Lewis College  
**Feryal Alayont**, Grand Valley State University

- 1:00PM  
(401.1) *Leveling up in the Learning Game with Generative AI*  
**Feryal Alayont**<sup>\*</sup>, Grand Valley State University (1203-101-44290)
- 1:30PM  
▶ (401.2) *Online Homework in the Age of AI: A Look at Student Preferences*  
**Jordan Gill**<sup>\*</sup>, Lansing Community College (1203-101-39878)
- 2:00PM  
▶ (401.3) *Appropriate and Helpful Uses of AI in ODEs, Student Perspectives*  
**Erich McAlister**<sup>\*</sup>, Fort Lewis College (1203-101-43664)
- 2:30PM  
(401.4) *Enhancing Quantitative Literacy: Integrating ChatGPT into the Course*  
**Rachael Marie Lund**<sup>\*</sup>, Michigan State University (1203-101-43913)
- 3:00PM  
(401.5) *To Use or Not to Use: Coming to Terms with Generative AI as Both a Teacher's Pet and the Spawn of Evil*  
**Dr. Gizem Karaali**<sup>\*</sup>, Pomona College (1203-101-44474)
- 3:30PM *Open Conversation Time*

**(402) AMS Special Session on Geometric and Topological Combinatorics, II**

**SATURDAY, JANUARY 11 1:00PM–6:00PM Tahoma 5, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Gaku Liu**, University of Washington  
**Isabella Novik**, University of Washington  
**Bennet Goeckner**, University of Washington

- 1:00PM  
▶ (402.1) *The transversal numbers of simplicial polytopes, simplicial spheres, and pure simplicial complexes*  
**Hailun Zheng**<sup>\*</sup>, University of Hawai'i at Mānoa (1203-05-38360)
- 2:00PM  
(402.2) *Simplicial complexes with many facets are vertex decomposable*  
**Anton Michael Dochtermann**<sup>\*</sup>, Texas State University, **Ritika Nair**, Oklahoma State University, **Jay Schweig**, Oklahoma State University, **Adam L. Van Tuyl**, McMaster University and **Russ Woodroffe**, University of Primorska (1203-05-45580)
- 2:30PM  
▶ (402.3) *Solving puzzles of shellable simplicial spheres*  
**Yirong Yang**<sup>\*</sup>, University of Washington (1203-05-38179)
- 3:00PM  
(402.4) *A conditional lower bound for the Turán number of spheres*  
**Marta Pavelka**<sup>\*</sup>, Carnegie Mellon University and **Andrew Newman**, Carnegie Mellon University (1203-05-42640)
- 3:30PM  
▶ ◆ (402.5)  *$sq\mathcal{S}$ -Chromatic polynomials*  
**Andres R. Vindas-Melendez**<sup>\*</sup>, Harvey Mudd College, **Esme Bajo**, Art of Problem Solving and **Matthias Beck**, San Francisco State University (1203-05-38743)
- 4:00PM  
▶ ◆ (402.6) *Valuation polytopes of height two posets*  
**Anastasia Chavez**<sup>\*</sup>, Saint Mary's College of California, **Federico Ardila**, San Francisco State University, **Jessica De Silva**, California State University, Stanislaus, **Jose Luis Herrera Bravo**, Universidad del Cauca and **Andrés R Vindas Meléndez**, Harvey Mudd College (1203-52-42351)
- 4:30PM  
▶ (402.7) *Higher-Categorical Associahedra*  
**Spencer Backman**<sup>\*</sup>, University of Vermont (1203-05-39345)
- 5:00PM  
(402.8) *On the amplituhedron and its tilings*  
**Chaim Even-Zohar**, Technion, **Tsviqa Lakrec**, University of Geneva, **Matteo Parisi**, CMSA, **Melissa Sherman-Bennett**<sup>\*</sup>, UC Davis, **Ran Tessler**, Weizmann Institute and **Lauren Kiyomi Williams**, Harvard University (1203-05-43173)

**(403) AMS Special Session on Geometry and Machine Learning, II**

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**SATURDAY, JANUARY 11 1:00PM–6:00PM 613, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Yang-Hui He**, City, University of London  
**Fabian Ruehle**, Northeastern University  
**Yaim Cooper**, University of Notre Dame

**Tingting Tang**, San Diego State University

- 1:00PM  
▶ ◆ (403.1) *The Real Tropical Geometry of Neural Networks for Binary Classification*  
**Marie-Charlotte Brandenburg**, KTH, **Georg Loho**, University of Twente and **Prof. Guido Francisco Montufar**<sup>\*</sup>, University of California, Los Angeles (1203-68-42438)
- 2:00PM  
(403.2) *Searching for black swans*  
**Sergei Gukov**<sup>\*</sup>, California Institute of Technology (1203-90-44679)
- 3:00PM  
▶ (403.3) *Not All Language Model Features Are Linear*  
**Joshua Engels**<sup>\*</sup>, MIT, **Isaac Liao**, MIT, **Eric J Michaud**, MIT, **Wes Gurnee**, MIT and **Max Tegmark**, MIT (1203-68-43413)
- 4:00PM  
(403.4) *Machine-learning invariants of arithmetic curves*  
**Yang-Hui He**, London Institute for Mathematical Sciences, **Kyu-Hwan Lee**<sup>\*</sup>, University of Connecticut and **Thomas Oliver**, University of Westminster (1203-11-42882)
- 5:00PM  
▶ ◆ (403.5) *ReLU Neural Networks with Linear Layers Learn Single- and Multiple-Index Models*  
**Suzanna Parkinson**<sup>\*</sup>, University of Chicago (1203-68-43602)

**(404) AMS Special Session on History of Mathematics, III**

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**SATURDAY, JANUARY 11 1:00PM–5:00PM 608, Level Six, Seattle Convention Center Arch at 705 Pike**

- Organizers: **Deborah Kent**, University of St. Andrews  
**Elizabeth Hunter**, University of Chicago  
**Sloan Evans Despeaux**, Western Carolina University  
**Victor J. Katz**, University of Washington
- 1:00PM  
▶ (404.1) *Jamshīd al-Kāshī in India: A 18th-Century Story of Transmission in Trigonometry*  
**Glen R. Van Brummelen**<sup>\*</sup>, Trinity Western University, **Clemency Montelle**, University of Canterbury and **Kim Plofker**, Kim Plofker (1203-01-40485)
- 2:00PM  
▶ (404.2) *Counter-Resolution: Inference and Human Understanding in Automated Reasoning*  
**Stephanie Dick**<sup>\*</sup>, Simon Fraser University (1203-01-42415)
- 2:30PM  
▶ (404.3) *Neurons on Paper: Writing as Intelligence before Deep Learning*  
**David E Dunning**<sup>\*</sup>, Smithsonian National Museum of American History (1203-01-41608)
- 3:00PM  
▶ ◆ (404.4) *Uses of metaphor for the history of mathematics: manifolds*  
**John McCleary**<sup>\*</sup>, Vassar College (1203-01-42157)
- 3:30PM  
▶ ◆ (404.5) *Hidden Figures Revealed*  
**Ranthyony A Clark**<sup>\*</sup>, Duke University (1203-01-44042)

- 4:00PM *Materiality and the histories of political violence in Mandelbrot's work*  
 ▶ (404.6) **Abigail Taylor-Roth\***, University of Chicago (1203-01-40461)
- 4:30PM *The Polish Break into Enigma*  
 ▶ (404.7) **Dan O'Leary\***, Independent (1203-01-36876)

**(405) AMS Special Session on Homotopy Theory, III**

**SATURDAY, JANUARY 11 1:00PM–5:00PM 617, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Morgan Peck Opie**, UCLA

**Piotr Pstragowski**, Harvard University  
**Kirsten Wickelgren**, Duke University  
**XiaoLin Danny Shi**, University of Washington

- 1:00PM *Parameterized proper equivariant incomplete stable homotopy theories and their operadic algebras*  
 (405.1)

**Bar Roytman\***, University of Michigan (1203-55-43014)

- 1:30PM *The duals of some higher real  $SK$ -theories at  $p=2$*   
 ◆ (405.2)

**Juan C. Moreno\***, University of Colorado Boulder (1203-55-44989)

- 2:00PM *The generalized Tate diagram of the equivariant slice filtration*  
 (405.3)

**Yutao Liu**, University of Washington, **XiaoLin Danny Shi**, University of Washington and **Guoqi Yan\***, University of Notre Dame (1203-55-42801)

- 2:30PM *Toward Computations of  $C_3$ -Equivariant Stable Stems*  
 ▶ (405.4)

**Yueshi Hou\***, University of California San Diego and **Shangjie Zhang**, University of California, San Diego (1203-55-44395)

- 3:00PM *Towards the  $SK(2)$ -local homotopy groups of  $\mathbb{R}P^2 \wedge \mathbb{C}P^2 \wedge \mathbb{H}P^2$  at  $p=2$*   
 (405.5)

**Sihao Ma\***, University of Notre Dame (1203-55-44317)

- 3:30PM *Transfer systems for rank two elementary Abelian groups*  
 (405.6)

**Christy Hazel\***, Grinnell College (1203-55-44987)

- 4:00PM *Twists of  $MString \wedge BU(1)$ , sphere bundles over  $\mathbb{C}P^2$ , and anomalies of heterotic string theories*  
 (405.7)

**Natalia María Pacheco-Tallaj\***, Massachusetts Institute of Technology (1203-55-43840)

- 4:30PM *Weight Filtrations and Derived Motivic Measures*  
 (405.8)

**Anubhav Nanavaty\***, University of California, Irvine (1203-14-45006)

**(406) AMS Special Session on L-functions, Automorphic Forms, and Their Applications, II**

**SATURDAY, JANUARY 11 1:00PM–6:00PM 604, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Riad Masri**, Texas A&M University  
**Sheng-Chi Liu**, Washington State University

- 1:00PM *Eisenstein series and the Random Wave Conjecture*  
 (406.1)

**Rizwanur Khan\***, University of Texas at Dallas (1203-11-42904)

- 2:00PM *Relative Trace Formula and Automorphic L-functions*  
 ▶ ◆ (406.2)

**Liyang Yang\***, Princeton University (1203-11-40870)

- 3:00PM *The subconvexity problem for Rankin-Selberg L-functions*  
 (406.3)

**Junxian Li\***, University of California, Davis (1203-11-42291)

- 4:00PM *Second Moment of  $GL(3)$  L-functions*  
 (406.4)

**Agniva Dasgupta**, The University of Texas at Dallas, **Wing Hong Leung\***, Rutgers University and **Matthew P. Young**, Rutgers University (1203-11-42806)

- 5:00PM *On higher regulators of Picard modular surfaces*  
 (406.5)

**Linli Shi\***, University of Connecticut (1203-11-42800)

- 5:30PM *Euler Systems and  $p$ -adic L-functions from the Perspective of Adelic Distributions*  
 ▶ (406.6)

**Jae Hyung Sim\***, Boston University (1203-11-38495)

**(407) AMS Special Session on Local-to-Global in Apollonian Circle Packings and Beyond, II**

**SATURDAY, JANUARY 11 1:00PM–4:30PM 618, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Katherine E. Stange**, University of Colorado, Boulder

**Catherine Maria Hsu**, Swarthmore College

**Summer Haag**, University of Colorado, Boulder

**Elena Fuchs**, UC Davis

- 1:00PM *On the analytic theory of isotropic ternary quadratic forms*  
 (407.1)

**William Duke\***, UCLA (1203-11-44583)

- 2:00PM *Apollonian Circle Packings, Quadratic Forms, and Indefinite Theta Series*  
 (407.2)

**Daniel Lautzenheiser\***, Cerro Coso Community College (1203-11-38885)

- 2:30PM *A geometric approach to the local-global principle for circle packings*  
 (407.3)

**Daniel Everett Martin\***, Clemson University (1203-52-42540)

- 3:00PM *Curves on surfaces and Apollonian packings in high dimensions*  
 (407.4)

**Arthur Baragar\***, University of Nevada, Las Vegas (1203-52-41959)

- 3:30PM *Super Approximation for thin subgroups of  $SL_2(\mathbb{Z}) \times SL_2(\mathbb{Z})$*   
 (407.5)

**Xin Zhang\***, The University of Hong Kong (1203-11-41834)

4:00PM *Traces of the Commutator Subgroup of*  
 ▶ (407.6)  $\mathcal{S}\{\Gamma(2)\}$   
**Brooke Logan Ogrodnik**, Metron Inc (1203-11-42193)

**(408) AMS Special Session on Mathematics and Sports, I**

SATURDAY, JANUARY 11 1:00PM–6:00PM 213, Level Two,  
 Seattle Convention Center Arch at  
 705 Pike

- Organizers: **Amanda Harsy**, Lewis University  
**Paul W von Dohlen**, William Paterson University  
**Filippo Posta**, Phoenix College
- 1:00PM *Shot Expectation Modeling in College Lacrosse*  
 ▶ (408.1) **Adam Childers**, Roanoke College (1203-62-41136)
- 1:30PM *The Impact of Subjective Scoring in FIS World Cup Ski Jumping*  
 ▶ (408.2) **Tricia Muldoon Brown**, Georgia Southern University (1203-62-37638)
- 2:00PM *Scoring Distributions Across Sports: Peaks and Valleys, Streaks and Surprises*  
 ▶ (408.3) **Peter L Staab**, Fitchburg State University and **Rick Cleary**, Babson College (1203-62-43543)
- 2:30PM *Super Bowl Square Pools: Beyond Randomization*  
 ▶ (408.4) **Richard J Cleary**, Babson College and **Peter L Staab**, Fitchburg State University (1203-62-43546)
- 3:00PM *Predictive Modeling of Lower-Level English Club Soccer Using Ranking and Forecasting Methods*  
 ▶ ♦ (408.5) **Joshua Brown**, Ursinus College, **Yutong Bu**, Emory University, **Zachary Cheesman**, Bowdoin College and **Benjamin Orman**, Grinnell College (1203-102-37922)
- 3:30PM *Money Bull: Analyzing the Application of Ranking Methods to Rodeo*  
 ▶ ♦ (408.6) **Mia Adler**, Pomona College, **Ford McDill**, Wesleyan University, **Tiffanie Ng**, Kenyon College and **Will Paz**, Miami University (1203-102-37911)
- 4:00PM *Mathematics and Sports: Mentoring undergraduate research at Summer@ICERM*  
 ▶ (408.7) **Iris Horng**, University of Pennsylvania (1203-102-40059)
- 4:30PM *Do ping pong players get rusty?*  
 ▶ (408.8) **Michael Weselcouch**, Roanoke College (1203-102-43789)
- 5:00PM *Baseball hitting fields, what factors are most important?*  
 ▶ (408.9) **Megan Olivia Powell**, University of North Carolina Asheville and **Kitty Yang**, UNC Asheville (1203-00-42339)
- 5:30PM *Analysis of Home-field advantage in US professional soccer using expected goals*  
 ▶ (408.10) **Filippo Posta**, Phoenix College (1203-00-38650)

**(409) AMS Special Session on New Directions in Harmonic Analysis, II**

SATURDAY, JANUARY 11 1:00PM–6:00PM 304, Level Three,  
 Seattle Convention Center Arch at  
 705 Pike

- Organizers: **Andrew Walton Green**, Washington University In St. Louis  
**Brandon Sweeting**, University of Cincinnati  
**Nathan A. Wagner**, Brown University  
**Cody B. Stockdale**, Clemson University
- 1:00PM *Boundedness Results on Sparse Operators and Compositions of Dyadic Paraproducts.*  
 ▶ (409.1) **Valentia Fragkiadaki**, Texas A&M University and **Irina Holmes Fay**, Texas A&M University (1203-42-40833)
- 1:30PM *Inverses of product kernels and flag kernels on graded Lie groups*  
 (409.2) **Amelia Min Stokolosa**, University of Wisconsin-Madison (1203-43-39789)
- 2:00PM *Some Fine Properties of  $\mathcal{A}_p(\cdot)$  Weights*  
 (409.3) **Michael Penrod**, University of Alabama (1203-42-40090)
- 2:30PM *Chain Rule For Weighted Triebel-Lizorkin Spaces*  
 (409.4) **Sean Douglas**, University of British Columbia (1203-42-43285)
- 3:00PM *The  $L^p$  to  $L^q$  boundedness of commutators of the Cauchy transform*  
 ♦ (409.5) **Adam Mair**, Bucknell University (1203-42-41096)
- 3:30PM *Characterizing rectifiability in terms of principal values*  
 (409.6) **Emily Casey**, University of Washington, **Max Goering**, University of Jyväskylä, **Tatiana Toro**, Simons Laufer Mathematical Sciences Institute (SLMath) / MSRI and **Bobby L. E. Wilson**, University of Washington (1203-42-42527)
- 4:00PM *On the discrete maximally modulated quadratic Hilbert transform*  
 (409.7) **Anastasios Fragkos**, Georgia Institute of Technology and **Michael Lacey**, Georgia Institute of Technology (1203-42-43782)
- 4:30PM *On the curved Trilinear Hilbert transform*  
 (409.8) **Bingyang Hu**, Auburn University, Auburn, AL and **Victor Lie**, Purdue University (1203-42-42013)
- 5:00PM *Brascamp-Lieb inequalities on the Heisenberg groups*  
 (409.9) **Kaiyi Huang**, University of Wisconsin-Madison (1203-42-42699)
- 5:30PM *A pointwise ergodic theorem along fractional powers of primes*  
 (409.10) **Leonidas Daskalakis**, Rutgers University (1203-37-43819)

**(410) AMS Special Session on Nonlinear Algebraic Methods in Artificial Intelligence and Machine Learning, II**

**SATURDAY, JANUARY 11 1:00PM–3:30PM Skagit 3, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizer: **Jonathan Gryak**, University of Michigan, Ann Arbor

1:00PM  
▶ (410.1) *Collaborative Partition Regions: How Deep Networks Learn to Generalize In High-Dimension*  
**Randall Balestriero\***, Brown University (1203-57-44612)

1:30PM  
▶ (410.2) *Tensor decompositions for computational phenotyping*  
**Cristian Minoccheri\***, University of Michigan (1203-68-45158)

2:00PM  
(410.3) *Almost-universal symmetry-respecting architectures*  
**Ben Blum-Smith\***, Johns Hopkins University, **Ningyuan (Teresa) Huang**, Flatiron Institute, **Marco Cuturi**, Apple and **Soledad Villar**, Johns Hopkins University (1203-13-43979)

2:30PM  
▶ (410.4) *Algebraic Representations for Faster Predictions in Convolutional Neural Networks*  
**Johnny Joyce\***, University of Illinois at Chicago and **Prof. Jan Vershelde, PhD**, University of Illinois at Chicago (1203-68-43215)

3:00PM  
▶ (410.5) *Lie Group Symmetries and Continuous MDP Homomorphisms in Optimal Tracking Control Problems*  
**Jake Welde\***, University of Pennsylvania, **Vijay Kumar**, University of Pennsylvania, **Nishanth Rao**, University of Pennsylvania and **Pratik Kunapuli**, University of Pennsylvania (1203-68-45094)

**(411) AMS Special Session on Operators in Inverse Problems, Differential Equations, and Machine Learning, II**

**SATURDAY, JANUARY 11 1:00PM–5:30PM 201, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Hyun-Kyoung Kwon**, University of Albany SUNY

**Mikyong Lim**, Korea Advanced Institute of Science and Technology

**Doosung Choi**, Louisiana State University

1:00PM  
(411.1) *Robust Fourier Neural Networks for Noisy Data*  
**Halyun Jeong\***, SUNY at Albany (1203-65-44501)

1:30PM  
(411.2) *The inverse Born series for the reconstruction of Kerr nonlinearities.*  
**Nicholas DeFilippis**, NYU, **Shari L. Moskow\***, Drexel University and **John C Schotland**, Yale University (1203-35-44109)

2:00PM  
(411.3) *Inverse problem for the distributed fractional derivative*  
**Elena Cherkaev\***, University of Utah and **William Cvetko**, University of Utah (1203-47-44315)

2:30PM  
▶ (411.4) *Measurement operators in inverse scattering from locally perturbed periodic media*  
**Thi-Phong Nguyen\***, New Jersey Institute of Technology, **Fioralba Cakoni**, Rutgers University, New Brunswick and **Housseem Haddar**, INRIA, France (1203-47-42983)

3:00PM  
▶ (411.5) *A discrete potential theory with application to cloaking in graphs*  
**Fernando Guevara Vasquez\***, University of Utah and **Trent DeGiovanni**, Dartmouth College (1203-65-44354)

3:30PM  
(411.6) *Spectral Analysis of the Neumann-Poincaré operator for nearly touching tori*  
**Doosung Choi\***, Louisiana State University (1203-35-42048)

4:00PM  
▶ (411.7) *On the problem of active control of fields through the lenses of integral operators, inverse sources and optimization*  
**Daniel Toader Onofrei\***, Department of Mathematics, University of Houston (1203-45-41444)

4:30PM  
▶ (411.8) *Application of machine learning to the inverse problem of bioimpedance*  
**Hyeuknam Kwon\***, Yonsei University, Mirae campus (1203-35-44304)

5:00PM  
(411.9) *Inverse Problems in Nonlinear Acoustic Imaging*  
**Yang Zhang\***, University of Washington and **Li Li**, Yau Mathematical Sciences Center (1203-35-43953)

**(412) AMS Special Session on Quaternions, II**

**SATURDAY, JANUARY 11 1:00PM–6:00PM 602, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Johannes Familton**, Borough of Manhattan Community College

**Dr. Terrence Richard Blackman, BSc, MPhil, PhD**, Medgar Evers College (Chair)

**Chris McCarthy**, BMCC, City University of New York

1:00PM  
▶ (412.1) *Quaternion Signals associated with Hyperbolic Linear Canonical Transforms and Uncertainty*  
**Joao Pedro Morais\***, ITAM (1203-44-36824)

1:30PM  
▶ ♦ (412.2) *Consecutive Amino acids conformations in Proteins based on Dual Quaternions*  
**David Orbe\***, Universidad Autonoma Metropolitana, **Joao Pedro Morais**, ITAM and **José Antonio Moreno-Razo**, Universidad Autónoma Metropolitana (1203-92-43466)

2:00PM  
▶ (412.3) *Coquaternion as a functional module of biologic systems and geometry of oncogenesis*  
**Garri Davydyan\***, Appletree Medical Group (1203-16-42340)

2:30PM  
▶ (412.4) *Quaternions and Octonions from a Linear Algebra Viewpoint*  
**Roberta L. La Haye\***, Mount Royal University and **Peter Zizler**, Mount Royal University (1203-15-40683)

3:00PM *A Brief History of Hypercomplex Numbers*  
▶ (412.5) **Joel A Shelton**<sup>\*</sup>, Tusculum University (1203-17-36595)

3:30PM *Quaternions Real-ly aren't so Complex!*  
▶ ◆ (412.6) **Bob Palais**, University of Utah and **Zane Colter**<sup>\*</sup>, University of Utah (1203-16-45534)

4:00PM *QUATERNIONIC CORNER ROTATIONS*  
▶ (412.7) **Tevian Dray**<sup>\*</sup>, Oregon State University and **Corinne A. Manogue**, Oregon State University (physics) (1203-17-42486)

4:30PM *THE ALMOST-EXCEPTIONAL LIE ALGEBRA*  
(412.8)  $\mathfrak{sl}(3, \mathbb{H})$   
**Corinne A. Manogue**<sup>\*</sup>, Oregon State University (physics) and **Tevian Dray**, Oregon State University (1203-17-42494)

5:00PM *Quantum Bits and Quaternions*  
▶ (412.9) **David W. Lyons**<sup>\*</sup>, Lebanon Valley College (1203-94-38518)

5:30PM *Exploring the super-golden gates for  $PU(2)$  and its applications in quantum information*  
▶ ◆ (412.10) **Eve Bodnia**<sup>\*</sup>, UCSB and **Lana Azar**, UCSB (1203-81-40634)

***(413) AMS Special Session on Take the i Road: Welcoming Complex Numbers and Viewpoints Across the Undergraduate Curriculum, II***

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SATURDAY, JANUARY 11 1:00PM–6:00PM Chelan 2, Level 2,  
Seattle Convention Center Arch at  
800 Pike

Organizers: **Bob Sachs**, George Mason University  
**Paul Zorn**, St Olaf College

1:00PM *Complex Numbers and Functions in Algebra and Geometry*  
▶ (413.1) **Prof. Martin E Flashman**<sup>\*</sup>, Cal Poly Humboldt, University of Arizona (1203-30-41924)

1:30PM *"I can only add and subtract them..."*  
▶ (413.2) **Jeff Suzuki**<sup>\*</sup>, Brooklyn College (1203-01-42336)

2:00PM *Applications of complex analysis to ornithology and epidemiology*  
▶ (413.3) **Yves Nievergelt**<sup>\*</sup>, Eastern Washington University (1203-32-41467)

2:30PM *Complex Numbers in Service of Plane Geometry*  
▶ (413.4) **Frank A Farris**<sup>\*</sup>, Santa Clara University (1203-51-41481)

3:00PM *Homework for complex variables in MyOpenMath*  
(413.5) **Michael Bolt**<sup>\*</sup>, Calvin University (1203-97-44603)

3:30PM *Complex Competitions*  
▶ (413.6) **Edward Charles Keppelmann**<sup>\*</sup>, University of Nevada Reno (1203-30-44935)

4:00PM *Complex-Valued Functions are Everywhere, Well, At-Least in Calculus*  
▶ (413.7) **Douglas B Meade**<sup>\*</sup>, University of South Carolina (1203-101-45384)

4:30PM *From Unique Factorization of Gaussian Integers to Pythagorean Triple Triangles*  
▶ (413.8) **Jack S. Calcut**<sup>\*</sup>, Oberlin College (1203-51-43461)

5:00PM *Roots of Unity as a central topic in undergraduate mathematics*  
▶ (413.9) **Robert Lawrence Sachs**<sup>\*</sup>, George Mason University and **Paul Zorn**, St Olaf College (1203-97-44577)

5:30PM *Discussion*

***(414) AMS Special Session on The Convergence of AI, Math, and Statistics in Biomedical Research, II***

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SATURDAY, JANUARY 11 1:00PM–4:00PM Skagit 4, Lower  
Level, Seattle Convention Center  
Arch at 800 Pike

Organizers: **Keisha Cook**, Tulane University  
**Fnu Nisha**, Clemson University

1:00PM *Understanding long-term virus dynamics: lessons from hepatitis B and HIV infections*  
▶ (414.1) **Stanca Ciupe**<sup>\*</sup>, Virginia Tech (1203-92-39598)

2:00PM *Mathematical approaches to understanding the organization and dynamics of synthetic multicellular systems*  
▶ ◆ (414.2) **Amanda Alexander**<sup>\*</sup>, University of Houston (1203-92-45120)

2:30PM *A trait-based approach to describing reservoir species of mosquito-borne diseases*  
▶ ◆ (414.3) **Kyle Dahlin**<sup>\*</sup>, Virginia Tech, **Suzanne O'Regan**, Paperpile, LLC, **John Paul Schmidt**, University of Georgia, **Barbara Han**, Cary Institute of Ecosystem Studies and **John Drake**, University of Georgia (1203-92-43371)

3:00PM *Impact of Age-Targeted Vaccination on Malaria Dynamics*  
▶ (414.4) **Arnaja Mitra**<sup>\*</sup>, University of Maryland (1203-92-45069)

3:30PM *Mathematical Modeling and Investigation of Malaria Prevalence Changes with Vaccination*  
▶ (414.5) **Seoyun Choe**<sup>\*</sup>, University of Central Florida (1203-92-45383)

***(415) AMS Special Session on Using 3D-Printed and Other Digitally-Fabricated Objects in the Mathematics Classroom, II***

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SATURDAY, JANUARY 11 1:00PM–4:00PM Chelan 4, Level 2,  
Seattle Convention Center Arch at  
800 Pike

Organizers: **Paul E. Seeburger**, Monroe Community College  
**Shelby Stanhope**, U.S. Air Force Academy

1:00PM *Mathematics of floating 3D printed objects*  
▶ (415.1) **Evelyn Sander**<sup>\*</sup>, George Mason University (1203-76-40982)

2:00PM *Embodied Mathematics: Reflections on Teaching "Making Mathematics"*  
▶ (415.2)

**Peter Kagey**<sup>\*</sup>, Cal Poly Pomona (1203-101-39471)

3:00PM *Digital Fabrication in Geometry*  
▶ (415.3) **Rachelle DeCoste**<sup>\*</sup>, West Point (1203-101-45459)

3:30PM *Experiential Learning in Calculus with 3D*  
▶ ◆ (415.4) **Rebin Abdulkader Muhammad**<sup>\*</sup>, Montgomery College (1203-97-42469)

***(416) AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs, IV***

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**SATURDAY, JANUARY 11 1:00PM–6:00PM Skagit 1, Lower Level, Seattle Convention Center Arch at 800 Pike**

Organizers: **Mark Daniel Ward**, Purdue University  
**Patricia Cahn**, Smith College  
**Khang Duc Tran**, California State University Fresno  
**Darren A. Narayan**, Claremont McKenna College

1:00PM *Computationally Efficient Observability Analysis of Cardiac Dynamical Models*  
▶ (416.1) **Daniel Gawel**<sup>\*</sup>, DePaul University, **Emily Ramos**, Fordham University and **Devin Weber**, Soka University (1203-92-40845)

1:30PM *Virus Oriented SARS-CoV-2 Extended SEIR and Human Movement Model*  
▶ ◆ (416.2) **Keshav Kohli Verma**<sup>\*</sup>, Arizona State University, **Jose Robles**, University of California Berkeley and **Nourridine Siewe**, Rochester Institute of Technology (1203-92-37758)

2:00PM *Closeness Centrality in Asymmetric Graphs*  
▶ ◆ (416.3) **Nytha Ramanathan**<sup>\*</sup>, Rochester Institute of Technology, **Eduardo Ramirez**, Rochester Institute of Technology and **Dorothy X Suzuki-Burke**, Rochester Institute of Technology (1203-05-37744)

2:30PM *On the Strong Spectral Property for Matrices of Graphs*  
▶ ◆ (416.4) **Mia Schaefer**<sup>\*</sup>, Colorado State University and **Benjamin Walter**<sup>\*</sup>, Harvard University (1203-05-37824)

3:00PM *Time Series, Additive Energy, Uncertainty Principles, and Signal Recovery in Finite Settings*  
▶ ◆ (416.5) **Karam Ayman Aldahleh**<sup>\*</sup>, University of Rochester, Stem For All 2024 and **Joshua Iosevich**, Rochester Institute of Technology, Stem For All 2024 (1203-05-42097)

3:30PM *A Special Case of The Gy\`arf\'as tree Packing Conjecture*  
▶ (416.6) **Diep Ngoc Luong-Le**<sup>\*</sup>, Lehigh University and **Garth Isaak**, Lehigh University (1203-05-43756)

4:00PM *Generalizations of Circulant Graphs, Their Properties, and Applications to Quantum Error Correcting Codes*  
▶ ◆ (416.7) **Elisaveta Vera Samoylov**, Dartmouth College, **Layla Jarrahy**, Hamilton College and **Andreas Vincent Garcia**<sup>\*</sup>, University of Arizona (1203-05-45303)

4:30PM *The Prismatic Polyomino Puzzle*  
▶ (416.8) **D. M. Condon**, St. Lawrence University, **Eli B. Dugan**<sup>\*</sup>, Williams College, **Laney M. Goldman**, Harvey Mudd College and **Emily R. Williams**, Amherst College (1203-05-41867)

5:00PM *Three-Color Peg Solitaire*  
▶ (416.9) **Chris Bispels**, University of Maryland, Baltimore County, **Kendall Heiney**<sup>\*</sup>, Cedar Crest College, **Ava Kerry**, Miami University, **Geoffrey Kleinberg**, Moravian University and **Brittany Ohlinger**, Albright College (1203-102-41663)

5:30PM *Properties of Algebraically Defined Edge-Colored Graphs*  
▶ ◆ (416.10) **Aaron Christopherson**, Pomona College, **Zephyr Gilmore**, Bowdoin College, **Susanne Goldstein**, Oberlin College, **Christina Hoff**<sup>\*</sup>, Kutztown University, **Brian Kronenthal**, Kutztown University and **Karen B McCready**, King's College (PA) (1203-05-37711)

***(417) ASL Invited Address - Theodore A. Slaman, University of California, Berkeley***

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**SATURDAY, JANUARY 11 1:00PM–2:00PM 2A, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizer: **David Reed Solomon**, University of Connecticut

1:00PM *Extending Borel's Conjecture from Measure to Dimension*  
▶ (417.1) **Theodore Allen Slaman**<sup>\*</sup>, University of California, Berkeley (1203-03-37041)

***(418) ILAS Special Session on Innovative and Effective Ways to Teach Linear Algebra, II***

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**SATURDAY, JANUARY 11 1:00PM–4:30PM 603, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Sepideh Stewart**, University of Oklahoma  
**Gil Strang**, MIT  
**Megan Wawro**, Virginia Tech  
**David M. Strong**, Pepperdine University

1:00PM *Behind the Pixels: Basic Linear Algebra in Computer Graphics*  
▶ (418.1) **Timothy P Chartier**<sup>\*</sup>, Davidson College (1203-15-40680)

1:30PM *Applied linear algebra as the first undergraduate mathematics experience*  
▶ (418.2) **Daniel A Visscher**<sup>\*</sup>, Ithaca College (1203-101-44919)

- 2:00PM  
▶ (418.3) *Enhancing our Linear Algebra OER with Additional Features*  
**Paul F Zachlin**<sup>\*</sup>, Lakeland Community College and **Anna A Davis**, Ohio Dominican University (1203-101-45061)
- 2:30PM  
▶ (418.4) *Power Iteration and Rayleigh Quotient to Approximate Eigenvectors/Eigenvalues with MATLAB*  
**Mike Michailidis**<sup>\*</sup>, The MathWorks, Inc. (1203-15-43442)
- 3:00PM  
▶ (418.5) *Inspiring Linear Algebra Topics Using Radiography and Tomography*  
**Heather A Moon**<sup>\*</sup>, Washington State University, **Marie A Snipes**, Kenyon College and **Thomas J Asaki**, Washington State University (1203-15-43894)
- 3:30PM  
▶ (418.6) *Teaching Linear Algebra through Digital Image Processing*  
**Yevgeniy Galperin**<sup>\*</sup>, East Stroudsburg University of PA (1203-15-44252)
- 4:00PM  
▶ (418.7) *Bridging the abstract and numerical linear algebra with MATLAB*  
**Sepideh Stewart**<sup>\*</sup>, University of Oklahoma (1203-97-44674)

**(419) ILAS Special Session on Preserver Problems, II**

**SATURDAY, JANUARY 11 1:00PM–4:30PM 211, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Chi-Kwong Li**, College of William and Mary  
**Sushil Singla**, Phd Student, Department of Mathematics, Shiv Nadar University Delhi NCR  
**Bojan Kuzma**, University of Primorska  
**Edward Poon**, Embry-Riddle Aeronautical University

- 1:00PM  
(419.1) *On the optimal version of the fundamental theorem of chronogeometry*  
**Peter Semrl**<sup>\*</sup>, Insitute of Mathematics, Physics and Mechanics, Ljubljana, Slovenia (1203-15-38134)
- 1:30PM  
(419.2) *CANCELLED Maps on positive cones in operator algebras preserving relative entropies*  
**Lajos Molnar**<sup>\*</sup>, University of Szeged (1203-47-41160)
- 2:00PM  
▶ ◆ (419.3) *Spectrum preserving maps on unital  $C^*$ -algebras*  
**Shiho Oi**<sup>\*</sup>, Niigata University, Japan (1203-47-40384)
- 2:30PM  
◆ (419.4) *Characterizing inner local Jordan  $^*$ -derivations by action at idempotents*  
**Xiaofei Qi**, Shanxi University, **Bing Xu**, Shanxi University and **Jin-Chuan Hou**<sup>\*</sup>, Taiyuan University of Technology (1203-15-40758)
- 3:00PM  
(419.5) *(Strong) Numerical radius orthogonality on bounded linear operators*  
**Xiaofei Qi**<sup>\*</sup>, Shanxi University, **Jin-Chuan Hou**, Taiyuan University of Technology and

**Shaoxing Sun**, Shanxi University (1203-47-40768)

- 3:30PM  
(419.6) *Linear maps preserving  $\|\gamma\|$ -norm of tensor products of matrices*  
**Zejun Huang**, Shenzhen University, **Raymond Nung-Sing Sze**<sup>\*</sup>, The Hong Kong Polytechnic University and **Run Zheng**, The Hong Kong Polytechnic University (1203-15-44687)
- 4:00PM  
▶ ◆ (419.7) *On the geometry of the Birkhoff polytope*  
**Javad Mashreghi**<sup>\*</sup>, Laval University (1203-15-40325)

**JMM Workshop on Reimagining Exams to Focus on Meaningful Learning and Disrupt the Dominant Grade-Focused Culture**

**SATURDAY, JANUARY 11 1:00PM–2:30PM 4C-2, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizers: **Deborah Loewenberg Ball**, University of Michigan  
**Hyman Bass**, University of Michigan

**Professional Enhancement Program (PEP) 4B: Formalization in the Lean Theorem Prover**

**SATURDAY, JANUARY 11 1:00PM–3:00PM Willow A, Second Floor, Sheraton Grand Seattle**

This Professional Enhancement Program (PEP) will train mathematicians in the use of proof assistants, namely the Lean Interactive Theorem Prover. No prior familiarity with this technology will be assumed.

Organizer: **Alex Kontorovich**, Rutgers University

**(420) SIAM Minisymposium on Geometric Mechanics Formulations and Structure-Preserving Discretizations for Models of Physical Systems**

**SATURDAY, JANUARY 11 1:00PM–6:00PM 2B, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Jonas Actor**, Sandia National Laboratories  
**Anthony Gruber**, Sandia National Laboratories  
**Brian Tran**, Los Alamos National Laboratories  
**Chris Eldred**, Sandia National Laboratories

- 1:00PM  
▶ (420.1) *Hamiltonian formulation of several geophysical flows under free surfaces*  
**Qingshan Chen**<sup>\*</sup>, Clemson University (1203-37-42857)
- 1:30PM  
▶ (420.2) *Using the metriplectic 4-bracket for constructing thermodynamically consistent models and structure preserving numerical algorithms*  
**Philip James Morrison**<sup>\*</sup>, University of Texas at Austin (1203-80-44558)
- 2:00PM  
(420.3) *Geometric Mechanics Formulations for Fluids with Open Boundaries*  
**Chris Eldred**<sup>\*</sup>, Sandia National Laboratories, **Francois J. M. Gay-Balmaz**, Ecole Normale

- Superieure and **Meng Wu**, Ecole Normale Superieure de Paris (1203-49-44708)
- 2:30PM  
(420.4) *Discrete Dirac reduction of implicit Lagrangian systems with abelian symmetry groups*  
**Melvin Leok**<sup>\*</sup>, University of California, San Diego and **Alvaro Rodriguez Abella**, Instituto de Ciencias Matematicas, Madrid, Spain (1203-37-43166)
- 3:00PM  
▶ (420.5) *Minimal  $\ell^2$  Norm Discrete Multiplier Method*  
**Erick Schulz**, Plexim GmbH and **Andy T. S. Wan**<sup>\*</sup>, University of California, Merced (1203-37-42283)
- 3:30PM  
(420.6) *Semiexplicit Symplectic Integrators for Non-separable Hamiltonian Systems*  
**Buddhika Jayawardana**, University of Texas at Dallas and **Tomoki Ohsawa**<sup>\*</sup>, University of Texas at Dallas (1203-65-41734)
- 4:00PM  
(420.7) *Lie Group Variational Collision Integrators for a Class of Hybrid Systems*  
**Khoa Tran**<sup>\*</sup>, University of California, San Diego (1203-65-44327)
- 4:30PM  
(420.8) *Blow-up finite elements and intrinsic discretizations of the vector Laplacian on surfaces*  
**Yakov Berchenko-Kogan**, Florida Institute of Technology and **Evan Gawlik**<sup>\*</sup>, Santa Clara University (1203-65-43204)
- 5:00PM  
(420.9) *Subdivision Functor and Vector Bundle Valued DEC*  
**Anil N Hirani**<sup>\*</sup>, University of Illinois at Urbana-Champaign, **Daniel Berwick-Evans**, University of Illinois Urbana Champaign and **Mark D Schubel**, Apple, Inc. (1203-53-45191)
- 5:30PM  
(420.10) *Structure preserving discretization of fluid dynamics*  
**Albert Chern**<sup>\*</sup>, UC San Diego (1203-76-44633)

***(421) SIGMAA Special Session on Research in Undergraduate Mathematics Education, II***

**SATURDAY, JANUARY 11 1:00PM–6:00PM 610, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Brian P Katz**, California State University, Long Beach

**Deborah Moore-Russo**, University of Oklahoma

**Shandy Hauk**, San Francisco State University

**Kaitlyn Stephens Serbin**, The University of Texas Rio Grande Valley

- 1:00PM  
▶ (421.1) *Undergraduate Mathematics Coursework and the Mathematical Preparation of Teachers*  
**Elizabeth A Burroughs**<sup>\*</sup>, Montana State University and **Liz Arnold**, Montana State University (1203-97-42435)

- 1:30PM  
▶ ◆ (421.2) *Bridging the Gap: How Reforming Calculus Instruction Enhances Self-Efficacy and Success for Underrepresented Minority Students*

**Yaomingxin Lu**<sup>\*</sup>, California State University, Fresno and **Gabriel Michael Chavez**, CSUMB (1203-97-42487)

- 2:00PM  
▶ (421.3) *Addressing Equity and Identity in a General Education Mathematics Course*  
**Michelle Homp**<sup>\*</sup>, University of Nebraska-Lincoln, **Lisa Rezac**, University of St. Thomas, Minnesota and **Theresa Jorgensen**, University of Texas at Arlington (1203-97-41876)

- 2:30PM  
▶ ◆ (421.4) *Identity Awareness in STEM undergraduates: How to support students to develop their efficacy in STEM through community-building*  
**Jinsook Frances Park**<sup>\*</sup>, University of Hartford and **Anastasiia Minenkova**, University of Hartford (1203-104-43360)

- 3:00PM  
▶ ◆ (421.5) *Undergraduate Mathematical Play: Teaching for Learning and Engagement*  
**Amy Burns Ellis**<sup>\*</sup>, University of Georgia, **Robert Ely**, University of Idaho, **Dru Horne**, University of Georgia, **Anna Bloodworth**, University of Georgia, **Sohei Yasuda**, University of Georgia and **Sam Brien**, University of Idaho (1203-97-42872)

- 3:30PM  
▶ (421.6) *Problem collections more than the sum of their parts*  
**Hyman Bass**<sup>\*</sup>, University of Michigan (1203-97-40685)

- 4:00PM  
▶ (421.7) *Designing courseware for equitable access, engagement and learning in gateway mathematics: Centering the experiences and perspectives of students and faculty*  
**Ann Edwards**<sup>\*</sup>, WestEd (1203-97-43125)

- 4:30PM  
◆ (421.8) *A Research-Based Tool for Borrowing Ideas from Teaching Assistant (TA) Development Programs Like Yours*  
**Sean P Yee**<sup>\*</sup>, University of South Carolina and **Shandy Hauk**, San Francisco State University (1203-97-45274)

- 5:00PM  
▶ (421.9) *An Analysis of Instructor Feedback on Student Work*  
**Olga Hawranick**<sup>\*</sup>, Washington State University (1203-97-44660)

- 5:30PM  
▶ ◆ (421.10) *Productive Patterns of Questioning that Uncover and Advance Student Thinking in Relation to Foundational Calculus Concepts*  
**Maryann E Huey**<sup>\*</sup>, Drake University, **Alfred Limbere**, Drake University and **Enes Akbuga**, Drake University (1203-97-45395)

***(422) SLMATH (MSRI) Special Session on at the Intersection of Harmonic Analysis and Fractal Geometry, II***

**SATURDAY, JANUARY 11 1:00PM–6:00PM 611, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Samantha Sandberg-Clark**, The Ohio State University

**Alex McDonald**, The Ohio State University

**Scott Zimmerman**, The Ohio State University at Marion

**Krystal Taylor**, The Ohio State University,  
Department of Mathematics

- 1:00PM  
(422.1) *Incidence lower bounds and applications*  
**Alexander Cohen**<sup>\*</sup>, MIT, **Cosmin Pohoata**,  
Emory University and **Dmitrii Zakharov**, MIT  
(1203-05-40169)
- 1:30PM  
▶ (422.2) *On Kakeya Sets of Curves*  
**Arian Nadjimzadah**<sup>\*</sup>, University of California,  
Los Angeles (1203-42-42468)
- 2:00PM  
▶ ◆ (422.3) *Pinned Dot Product Sets*  
**Paige Bright**<sup>\*</sup>, University of British Columbia,  
**Caleb Z Marshall**, University of British  
Columbia and **Steven Michael Senger**,  
Missouri State University (1203-42-42972)
- 2:30PM  
▶ (422.4) *Fourier Dimension and Translation-Invariant  
Linear Equations*  
**Angel Diosdado Cruz**<sup>\*</sup>, University of British  
Columbia (1203-28-43597)
- 3:00PM  
◆ (422.5) *Planebrush argument for sticky Kakeya sets in  
 $\mathbb{R}^4$*   
**Mukul Rai Choudhuri**<sup>\*</sup>, University of British  
Columbia (1203-42-45382)
- 3:30PM  
(422.6) *Structure of Measures for which Ehrhard  
Symmetrization is Perimeter-Decreasing*  
**Kuan Ting Yeh**<sup>\*</sup>, Purdue University and **Sean  
McCurdy**, National Taiwan Normal University  
(1203-28-40867)
- 4:00PM  
▶ (422.7) *The Packing Dimension of Lineal Extensions*  
**Ryan Edward George Bushling**<sup>\*</sup>, University of  
Washington and **Jacob Fiedler**, University of  
Wisconsin-Madison (1203-28-42096)
- 4:30PM  
(422.8) *Self-similar sets and Lipschitz graphs*  
**Blair Davey**, Montana State University, **Silvia  
Ghinassi**<sup>\*</sup>, University of Washington and **Bobby  
L. E. Wilson**, University of Washington (1203-  
28-44901)
- 5:00PM  
(422.9) *Counting incidences of integral curves*  
**Kaiyi Huang**, University of Wisconsin-Madison,  
**Betsy Stovall**, University of Wisconsin-Madison  
and **Sarah E Tammen**<sup>\*</sup>, University of  
Wisconsin-Madison (1203-42-45494)
- 5:30PM  
(422.10) *Geometric square functions and regularity*  
**Emily Casey**<sup>\*</sup>, University of Washington (1203-  
42-42531)

***TPSE Panel: Aligning Mathematics Options with  
Students' Aspirations in Grades 11-14***

**SATURDAY, JANUARY 11 1:00PM-2:30PM 4C-4, Level Four,  
Seattle Convention Center Arch at  
705 Pike**

States are rethinking math options in the transition years between high school and higher education to ensure that students can access courses aligned with their aspirations. This session will explore the different ways states are answering tricky questions: When is the right time to allow different students to take different courses (statistics, quantitative reasoning, data science)? How can that be done equitably, based on students' interests not on preconceived notions about their potential?

Organizers: **Ted Coe**, former VP for Content Advocacy – Mathematics, Northwest Evaluation Association  
**Joleigh Honey**, Past-President, Association of State Supervisors of Mathematics (ASSM)  
**Scott Wolpert**, University of Maryland  
**David T Kung**, Charles A. Dana Center - UT-Austin  
**Ted Coe**, former VP for Content Advocacy – Mathematics, Northwest Evaluation Association  
**Joleigh Honey**, Past-President, Association of State Supervisors of Mathematics (ASSM)  
**Lya Snell**, Education Program Manager (Math & CS), Georgia Department of Education  
**Katherine F Stevenson**, California State University Northridge  
**Zarek Drozda**, Data Science 4 Everyone

***(423) AMS Special Session on Applied and  
Computational Commutative Algebra, II***

**SATURDAY, JANUARY 11 1:30PM-4:30PM 607, Level Six,  
Seattle Convention Center Arch at  
705 Pike**

Organizers: **Branden Stone**, Georgia Tech Research Institute  
**Eloisa Grifo**, University of Nebraska-Lincoln

- 1:30PM  
▶ (423.1) *Synthesizing Boolean Functions From Varieties  
With Prescribed Zeros*  
**Florian Enescu**<sup>\*</sup>, Georgia State University  
(1203-13-42261)
- 2:00PM  
(423.2) *Algebraic Foundations of Singular Learning  
Theory in Machine Learning: a survey talk*  
**Ines Bonacho Dos Anjos Henriques**<sup>\*</sup>,  
University of Manchester (1203-13-45195)
- 2:30PM  
▶ ◆ (423.3) *Algebraic Statistics for Exact Inference in  
Degree-Corrected Stochastic Block Models*  
**Felix Almendra Hernandez**<sup>\*</sup>, UC Davis (1203-  
05-42988)
- 3:00PM  
▶ (423.4) *Generalized Hamming weights and symbolic  
powers of Stanley-Reisner ideals of matroids*  
**Michael DiPasquale**, New Mexico State  
University, **Louiza Fouli**, New Mexico State  
University, **Arvind Kumar**<sup>\*</sup>, New Mexico State  
University and **Stefan Ovidiu Tohaneanu**,  
University of Idaho, USA (1203-13-37357)
- 3:30PM  
▶ (423.5) *A Heuristic Augmentation Algorithm for  
Discrete Total-Variation Problems*  
**Miles Eduard Bakenhus**<sup>\*</sup>, Illinois Institute of  
Technology, **Sven Leyffer**, Argonne National  
Laboratory and **Dominic Yang**, Argonne  
National Laboratory (1203-13-43931)
- 4:00PM  
(423.6) *Computational commutative algebra for  
evolutionary biology*  
**Travis Barton**, Meta, **Elizabeth Gross**<sup>\*</sup>,  
University of Hawai'i at Manoa, **Colby Long**,  
The College of Wooster and **Joseph Rusinko**,  
Hobart and William Smith (1203-62-43103)

***(424) AMS Special Session on Categorical  
Generalizations of Conditionalization, II***

**SATURDAY, JANUARY 11 1:30PM–5:30PM Yakima 1, Level 1, Seattle Convention Center Arch at 800 Pike**

Organizers: **Owen Biesel**, Southern Connecticut State University

**Colin McSwiggen**, New York University  
**Michael Titelbaum**, University of Wisconsin -- Madison  
**Theodore V Theodosopoulos**, Nueva School

1:30PM  
► (424.1) *Interacting  $\sigma$ -algebras and their cohomology*  
**Theodore V Theodosopoulos**, Nueva School (1203-60-44183)

2:00PM  
► (424.2) *Cohomology of Probability*  
**Owen Biesel**, Southern Connecticut State University, **Theodore V Theodosopoulos**, Nueva School, **Colin McSwiggen**, New York University and **Michael Titelbaum**, University of Wisconsin -- Madison (1203-60-45294)

2:30PM  
► (424.3) *Sheaves and Context-Sensitive Update*  
**Michael Titelbaum**, University of Wisconsin -- Madison (1203-60-44157)

3:00PM *Discussion 3*

3:30PM  
► (424.5) *A sheaf-theoretic reconstruction of statistical models*  
**Jun Otsuka**, Kyoto University, **Tatsuya Yoshii**, Kyoto University and **Hayato Saigo**, Nagahama Institute of Bio-Science and Technology (1203-62-43349)

4:00PM  
► (424.6) *Process, causality and noncommutative probability: A category-theoretic approach*  
**Hayato Saigo**, Nagahama Institute of Bio-Science and Technology (1203-18-42087)

4:30PM  
► (424.7) *Theory and Applications of Simplicial Distributions*  
**Cihan Okay**, Bilkent University (1203-81-45409)

5:00PM *Discussion 4*

**(425) AMS Special Session on Control Theory and Artificial Intelligence, II**

**SATURDAY, JANUARY 11 1:30PM–5:30PM 210, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Mohamed Ali Belabbas**, University of Illinois  
**Anthony Michael Bloch**, University of Michigan

1:30PM  
(425.1) *Koopman Operator Theory Based Machine Learning of Dynamical Systems*  
**Igor Mezic**, University of California, Santa Barbara (1203-37-42392)

2:00PM  
(425.2) *On the capabilities and limitations of autoencoders*  
**Matthew D Kvalheim**, University of Maryland, Baltimore County and **Eduardo D Sontag**, Northeastern University (1203-93-42979)

2:30PM *Coffee Break*

3:30PM  
► (425.4) *Lie Algebraic Approaches in Control and AI*  
**Maani Ghaffari**, University of Michigan (1203-22-41880)

4:00PM  
► (425.5) *Control theoretic formulations of adversarial machine learning*  
**Vikhyat Agarwal**, University of Richmond, **Kritim K. Rijal**, University of Richmond and **Caitlin Sales**, University of Richmond (1203-93-44590)

4:30PM  
◆ (425.6) *Optimal controls over sweeping processes and exponential penalty method for truncated sweeping sets*  
**Samara S Chamoun**, Michigan State University and **Vera Zeidan**, Michigan State University (1203-49-44926)

5:00PM  
► ◆ (425.7) *Binocular Visual Sensing Control using Feedback Linearization Approach*  
**Bhagya Athukorallage**, Department of Mathematics and Statistics, Williams College and **Bijoy Ghosh**, Department of Mathematics and Statistics, Texas Tech University (1203-93-45202)

**(426) AMS Special Session on Extremal and Probabilistic Combinatorics, II**

**SATURDAY, JANUARY 11 1:30PM–5:30PM Tahoma 3, Level Three, Seattle Convention Center Arch at 800 Pike**

Organizers: **Lina Li**, Iowa State University  
**Ruth Luo**, University of California, San Diego  
**Jd Nir**, Oakland University

1:30PM  
► (426.1) *Coloring Hypergraphs*  
**Nathan Lemons**, Los Alamos National Laboratory and **Zoltan Blazsik**, University of Szeged (1203-05-45739)

2:00PM  
(426.2) *Positive co-degree densities and jumps*  
**József Balogh**, University of Illinois Urbana-Champaign, **Anastasia Halfpap**, Iowa State University, **Bernard Lidicky**, Iowa State University and **Cory Palmer**, University of Montana (1203-05-42498)

2:30PM  
(426.3) *Positive co-degree thresholds in  $\mathbb{Z}_3$ -graphs*  
**Anastasia Halfpap**, University of Montana and **Van Magnan**, University of Vermont (1203-05-42360)

3:00PM  
(426.4) *Robustness of Erdős-Ko-Rado theorems for derangements*  
**Karen R. Gunderson**, University of Manitoba, **Karen Meagher**, University of Regina, **Joy M W Morris**, University of Lethbridge, **Venkata Raghu Tej Pantangi**, University of Regina and **Mahsa Nasrollahi Shirazi**, University of Manitoba (1203-05-41984)

3:30PM  
► ◆ (426.5) *Probabilistic parking functions*  
**Irfan Durmic**, Williams College, **Alex Han**, Yale University, **Pamela Estephania Harris**, Williams College, **Rodrigo Ribeiro**, University

of Denver and **Mei Yin**, University of Denver (1203-05-41245)

4:00PM  
▶ (426.6) *Exploring dynamic graphs: What to do when your flights keep getting canceled*  
**Amanda Epping Redlich**<sup>\*</sup>, University of Massachusetts Lowell (1203-05-42287)

4:30PM  
▶ (426.7) *Monochromatic Sums and Products over  $\mathbb{Q}$*   
**Ryan Alweiss**<sup>\*</sup>, University of Cambridge (1203-05-42074)

5:00PM  
▶ (426.8) *A group-action Szemerédi-Trotter theorem and applications to orchard problems*  
**Yifan Jing**<sup>\*</sup>, the Ohio State University (1203-20-41686)

### ***(427) AMS Special Session on Function Spaces and Their Applications, II***

**SATURDAY, JANUARY 11 1:30PM–4:00PM 203, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **William Verreault**, University of Toronto  
**Javad Mashreghi**, Laval University

1:30PM  
(427.1) *Muckenhoupt Ap weights, BMO, distance functions and related problems*  
**Marcus Pasquariello**, Brown University and **Ignacio Uriarte-Tuero**<sup>\*</sup>, University of Toronto (1203-42-44655)

2:00PM  
(427.2) *A counterexample to the weak Shanks conjecture*  
**Catherine Anne Beneteau**<sup>\*</sup>, University of South Florida (1203-32-43907)

2:30PM  
(427.3) *Interpolation in pairs of Hilbert function spaces*  
**Scott A McCullough**, University of Florida and **Georgios Tsikalas**<sup>\*</sup>, Vanderbilt University (1203-46-42508)

3:00PM  
(427.4) *Observability of the heat equation from very small sets.*  
**Andrew Walton Green**, Washington University In St. Louis, **Kévin Le Balc'h**, INRIA, Sorbonne Université, Université de Paris, CNRS, Laboratoire Jacques-Louis Lions, **Jérémy Martin**, INRIA, Sorbonne Université, Université de Paris, CNRS, Laboratoire Jacques-Louis Lions and **Marcu-Antone Orsoni**<sup>\*</sup>, Université Laval (1203-93-45190)

3:30PM  
◆ (427.5) *Fourier algebras of the group of affine transformations and a dual convolution*  
**Mahya Ghandehari**<sup>\*</sup>, University of Delaware and **Yemon Choi**, Lancaster University (1203-43-43378)

### ***(428) AWM Workshop Special Session on Women in Groups, Geometry, and Dynamics, II***

**SATURDAY, JANUARY 11 1:30PM–5:30PM 4C-1, Level Four, Seattle Convention Center Arch at 705 Pike**

Organizers: **Rachel Skipper**, University of Utah  
**Carolyn Abbott**, Brandeis University

1:30PM  
◆ (428.1) *Isometries and affine transformations of flat surfaces of infinite type*

**Mauro Artigiani**, Universidad Nacional de Colombia, **Anja Randecker**, Heidelberg University, **Chandrika Sadanand**<sup>\*</sup>, Bowdoin College, **Ferrán Valdez**, Centro de Ciencias Matemáticas and **Gabriela Weitze-Schmithüsen**, Universität des Saarlandes (1203-57-42387)

2:00PM  
◆ (428.2) *Rigidity Results for Surface Amalgams*  
**Yandi Wu**<sup>\*</sup>, Rice University (1203-57-42444)

2:30PM  
◆ (428.3) *A lower bound on volumes of end-periodic mapping Tori*  
**Elizabeth Field**<sup>\*</sup>, University of Washington Bothell, **Autumn E Kent**, University of Wisconsin - Madison, **Christopher Jay Leininger**, Rice University and **Marissa Kawehi Loving**, University of Wisconsin Madison (1203-57-45757)

3:00PM  
▶ (428.4) *On the Nilpotent Representation Theory of Hyperbolic  $n$ -Manifolds*  
**Milana Golich**<sup>\*</sup>, Purdue University (1203-57-43958)

3:30PM *Break*

4:00PM  
▶ (428.6) *Normal Stalling's Completion*  
**Rebecca Rechkin**<sup>\*</sup>, University of Utah (1203-22-44902)

4:30PM  
▶ (428.7) *Separable homology of graphs and the Whitehead complex*  
**Becky F Eastham**<sup>\*</sup>, University of California-Riverside (1203-57-45228)

5:00PM  
◆ (428.8) *The Complex of Cuts in a Stone Space*  
**Beth Claire Branman**<sup>\*</sup>, University of Virginia (1203-20-44292)

### ***(429) AWM Workshop Special Session on Women in Operator Algebras, II***

**SATURDAY, JANUARY 11 1:30PM–6:00PM 619, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Sarah Reznikoff**, Kansas State University  
**Maria Grazia Viola**, Lakehead University

1:30PM  
▶ (429.1) *Simplicity of  $C^*$ -algebras of non-Hausdorff  $SZ_2$ -multispinal groupoids*  
**Carla Emilia Farsi**<sup>\*</sup>, University of Colorado, **Nadia Larsen**, University of Oslo, **Judith A. Packer**, University of Colorado, Boulder and **Nathaniel Thiem**, University of Colorado (1203-46-42639)

2:30PM  
(429.2) *The ideal intersection property for partial reduced crossed products*  
**Matthew Kennedy**, University of Waterloo, **Larissa Kroell**<sup>\*</sup>, University of Waterloo and **Camila Sehnem**, University of Waterloo (1203-46-44555)

3:00PM  
(429.3) *The local bisection hypothesis for twists over étale Hausdorff groupoids*

**Becky Armstrong**, WWU Munster, **Jonathan Brown**, University of Dayton, **Lisa Orloff Clark**, Victoria University of Wellington, **Kathryn McCormick**, California State University, Long Beach, **Kristin Courtney**, University of Southern Denmark, **Ying-Fen Lin**, Queen's University Belfast and **Jacqui Ramagge**, Durham University (1203-46-44048)

4:00PM  
◆ (429.4) *Rigidity results for group von Neumann algebras with diffuse center I: direct products*  
**Ionut Chifan**, University of Iowa, **Adriana Fernandez I Quero**, University of Iowa and **Hui Tan**, University of California, Los Angeles (1203-46-39856)

4:30PM  
(429.5) *Rigidity results for group von Neumann algebras with diffuse center II: central extensions*  
**Hui Tan**, University of California, Los Angeles, **Ionut Chifan**, University of Iowa, **Adriana Fernandez I Quero**, University of Iowa and **Denis V Osin**, Vanderbilt University (1203-46-42627)

**(430) ILAS Special Session on Randomness in Numerical Linear Algebra, II**

**SATURDAY, JANUARY 11 1:30PM–4:30PM 204, Level Two, Seattle Convention Center Arch at 705 Pike**

Organizers: **Heather Denise Wilber**, University of Washington  
**Anne Greenbaum**, University of Washington

1:30PM  
(430.1) *Applications of orthogonal polynomials in the study of random matrices and randomized algorithms*  
**Thomas D. Trogdon**, University of Washington (1203-65-40989)

2:30PM  
(430.2) *Sketchy Moment Matching: Toward Fast and Provable Data Selection for Finetuning*  
**Yijun Dong**, New York University, **Hoang Phan**, New York University, **Xiang Pan**, New York University and **Qi Lei**, New York University (1203-65-39494)

3:00PM *Break*

3:30PM  
(430.4) *Regularization of the eigenvector condition number via sparse perturbations*  
**Rikhav Shah**, UC Berkeley, **Edward Zeng**, NYU and **Nikhil Srivastava**, UC Berkeley (1203-65-45029)

4:00PM  
▶ (430.5) *Fast Divide-and-Conquer for the Generalized Eigenvalue Problem*  
**Ryan Schneider**, University of California Berkeley, **James Demmel**, University of California Berkeley and **Ioana Dumitriu**, University of California San Diego (1203-65-41370)

**(431) AMS Special Session on Recent Developments in PDEs and Related Areas, II**

**SATURDAY, JANUARY 11 2:00PM–6:00PM 303, Level Three, Seattle Convention Center Arch at 705 Pike**

Organizers: **Zongyuan Li**, City University of Hong Kong  
**Xueying Yu**, Oregon State University  
**Zhiyuan Zhang**, Northeastern University  
**Weinan Wang**, University of Oklahoma

2:00PM  
(431.1) *On the 2D MHD-Boussinesq System with Calmed Ohmic Heating*  
**Yuan Pei**, Western Washington University, **Adam Larios**, University of Nebraska-Lincoln and **Matt Enlow**, University of Nebraska-Lincoln (1203-35-42107)

2:30PM  
▶ (431.2) *Smoothness property of hypoelliptic kinetic equations near boundaries*  
**Yuzhe Zhu**, The University of Chicago (1203-35-42959)

3:00PM  
▶ (431.3) *RESONANT  $(p, q)$ -EQUATIONS WITH ROBIN BOUNDARY CONDITION*  
**Michael E. Filippakis**, Department of Digital Systems, University of Piraeus, Greece (1203-35-42994)

3:30PM  
◆ (431.4) *Stable determination of time-dependent collision kernel in the nonlinear Boltzmann equation*  
**Lili Yan**, University of Minnesota (1203-35-43252)

4:00PM  
▶ (431.5) *Harnack inequalities for weakly coupled nonlocal systems*  
**Xiangqian Meng**, University of Washington-Seattle (1203-60-43451)

4:30PM  
▶ (431.6) *Neural Network Assisted Approximations of High-Resolution Solutions to PDEs*  
**Mike Wendels**, University of Washington (1203-65-44855)

5:00PM  
(431.7) *On the Hamiltonian structure of the Vlasov equation*  
**Joseph Kentaro Miller**, Stanford University (1203-35-45065)

5:30PM  
(431.8) *Existence and Stability of Nonlinear Waves: a Computer-Assisted Approach*  
**Noah Corbett**, Florida Atlantic University and **J.D. Mireles James**, Florida Atlantic University (1203-35-45573)

**(432) AMS Special Session on Vector Bundles and Quantization, II**

**SATURDAY, JANUARY 11 2:00PM–5:00PM 614, Level Six, Seattle Convention Center Arch at 705 Pike**

Organizers: **Steven Rayan**, University of Saskatchewan  
**Ruxandra Moraru**, University of Waterloo  
**Laura P. Schaposnik**, University of Illinois at Chicago

2:00PM  
(432.1) *Twistor spaces and chiral algebras*  
**Natalie M. Paquette**, University of Washington (1203-53-39651)

2:30PM (432.2) *Co-Higgs bundles on Hopf surfaces*  
**Eric Boulter**, University of Saskatchewan and  
**Ruxandra Moraru**, University of Waterloo  
(1203-32-43770)

3:00PM *Break*

4:00PM (432.4) *An iterated spectral correspondence on curves*  
▶ **Kuntal Banerjee**, University of Saskatchewan  
(1203-14-36743)

4:30PM (432.5) *Photon divisors*  
**Marina Logares**, Universidad Complutense  
Madrid (1203-14-45078)

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***JMM Panel on Fields of Success: Math Alliance  
Scholars Tell their Stories from Undergraduate to  
Graduate and Beyond.***

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SATURDAY, JANUARY 11 2:00PM–3:30PM 4C-3, Level Four,  
Seattle Convention Center Arch at  
705 Pike

Organizers: **David Goldberg**, PhD, Purdue University  
**Theresa Martines**, University of Texas, Austin  
**Jorge Cisneros**, University of Texas at Austin  
**Ranthonny A Clark**, The Ohio State University

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***(433) AMS-MAA-SIAM Gerald and Judith Porter  
Public Lecture - Ravi Vakil, Stanford University***

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SATURDAY, JANUARY 11 2:15PM–3:20PM Ballroom 6E,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizers: **Brian D. Boe**, University of Georgia  
**Carol Woodward**, Lawrence Livermore  
National Laboratory

2:15PM (433.1) *The Mathematics of Doodling*  
▶ **Ravi D Vakil**, Stanford University (1203-00-  
40584)

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***JMM Workshop: High School Mathematics  
Reimagined***

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SATURDAY, JANUARY 11 3:00PM–4:30PM 4C-2, Level Four,  
Seattle Convention Center Arch at  
705 Pike

In this session, participants will examine a framework based on the newest publication from the National Council of Teachers of Mathematics (NCTM) for reimagining high school mathematics to make it more relevant, useful, and engaging for students.

Organizer: **Latrenda Knighten**, National Council of  
Teachers of Mathematics

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***TPSE Panel: Tools for Supporting Conversations  
About Teaching***

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SATURDAY, JANUARY 11 3:00PM–4:30PM 4C-4, Level Four,  
Seattle Convention Center Arch at  
705 Pike

What are the challenges encountered when attempting to center conversations about active learning on the mathematics being prioritized, how students engage with it, and what is being learned? Faculty members from the

Teaching for PROWESS project share tools that can be used in various settings to focus conversations about teaching on particular aspects of students' experiences.

Organizers: **Scott Andrew Wolpert**, University of Maryland and TPSE Math

**Nancy J Sattler**, Terra State Community College

**Ann Sitomer**, Oregon State University

**Scot Pruyn**, Clackamas Community College

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***(434) AMS Invited Address - Semyon Dyatlov, MIT***

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SATURDAY, JANUARY 11 3:20PM–4:25PM Ballroom 6E,  
Level Six, Seattle Convention Center  
Arch at 705 Pike

Organizer: **Brian D. Boe**, University of Georgia

3:20PM (434.1) *Uncertainty principles in quantum chaos*  
**Semyon Dyatlov**, Massachusetts Institute of  
Technology (1203-81-36448)

**Note**

To maintain the schedule, time limits for talks will be strictly enforced. For papers with more than one author, an asterisk follows the name of the author who plans to present the paper at the meeting.

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

Papers flagged with a solid diamond have been designated by the author as a presentation by a member of a minority group in mathematics.

Abstracts of papers presented at the meeting will be found in Volume 46, Number 1 of Abstracts of Papers presented to the American Mathematical Society. The middle two or three digits of the abstract number, e.g. 1203-13-18984, refer to the Mathematical Reviews subject classification assigned by the individual author. You may also find them at <https://meetings.ams.org/math/jmm2025/meetingapp.cgi/Index/Subject> and on the mobile app.