



MAA MATHFEST

August 1-4, 2018

PROGRAM

DENVER

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WELCOME TO MAA MATHFEST!

Welcome to MAA MathFest, the great summer mathematics get-together!

My Midwestern roots and these fair weather days with the long, cool nights turn my head to thoughts of family reunions, neighborhood potlucks, state fairs, ice cream, and summer get-togethers. It's time to pack up the students and colleagues and travel to a beautiful destination to meet up with mathematical family and friends. It's time for MAA MathFest!

Many hours of hard work go into the planning for this meeting: be sure to thank all MAA staff when you see them in the exhibit hall or scurrying off to a meeting. Let's all give a hearty thank you to outgoing Associate Secretary Gerard Venema, the man behind the scientific program for this conference, and the many member-volunteers who have put much thought into making sure that you have a fruitful, interesting, and fun time. This is Gerard's last meeting as Associate Secretary, and it looks to be a great one.

You're holding a guide in your hands to all the fun we have in store for you this week at MAA MathFest. There is an impressive line-up of invited addresses, led by Earle Raymond Hedrick lecturer Gigliola Staffilani, with nine other top-shelf talks given by folks like Eugenia Cheng, Arlie Petters, Joseph Teran, and Lisette de Pillis.

Your days will be filled with back-to-back mathematical nuggets, presentations on evidence-based teaching techniques including the MAA Instructional Practices Guide, discussions on broadening participation in mathematics, posters and papers by students, and recreational math treats.

In between the exchange of ideas, be sure to save time for the social events like the MAA Undergraduate Ice Cream Social. In particular, I'd like to invite everyone to the President's Membership Jubilee on Thursday evening. We will honor all MAA members, especially those celebrating 25 and 50 years of membership, as we enjoy a musical performance featuring some of our own MAA members. This event is open to all attendees and we welcome you to come as you are.

Introduce yourself to folks sitting near you in each session; I know several stories of lifelong friends who met in this way. And when you see a student or junior colleague, tell them how much you appreciate having them in our community. Enjoy MAA MathFest, and take home mathematical inspiration, new ideas, good memories, and a new friend or two.

Thank you for attending,
Deanna Haunsperger
President, MAA



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$$\text{Potential} = \lim_{\epsilon \rightarrow 0} \int_0^{\frac{\pi}{2} - \epsilon} \tan(\theta) d\theta$$

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WELCOME TO DENVER!

MAA MathFest attendees will be at the heart of the city and will have no trouble finding sightseeing opportunities and fun right outside the meeting venue. Be sure to visit the city's world-class attractions, thriving arts scene, and dozens of innovative restaurants. For more information, visit Denver.org/mathfest.

Wireless Internet Access

Connect on a computer:

1. Connect to **MAA MathFest**
2. Open a new browser
3. Enter **mathfest2018** and click connect
4. Once the Sheraton page loads then you are connected to the internet

Phones will connect via their software settings. Please enter the **mathfest2018** password.

Meet Attendees and Exhibitors in the Exhibit Hall

The MAA Exhibit Hall is located in the Plaza Exhibits, Concourse Level of the Plaza Building. Be sure to stop by to network colleagues, whenever taking breaks from education sessions, or stroll through the exhibitors' booths and discover all the Exhibit Hall has to offer, including the MAA Pavilion. Poster sessions will be taking place in the Exhibit Hall on Thursday and Friday afternoons.

Coffee breaks will also be available in the Exhibit Hall

Thursday, August 2:

10:00 a.m. -10:30 a.m., 2:30 p.m -3:30 p.m.

Friday, August 3:

10:00 a.m. -10:30 a.m., 3:00 p.m.-3:30 p.m.

Saturday, August 4:

10:00 a.m.-10:30 a.m.

Sheraton Downtown Denver Dining Options

15|Fifty

Breakfast: 6 a.m. - 11 a.m.

Lounge: 4 p.m. - 10 p.m.

16Mix

4 p.m.- 2 a.m.

Peet's Coffee & Tea

6 a.m.- 4 p.m.

Yard House

Sunday - Thursday, 11 a.m. - 12 a.m.

Friday - Saturday, 11 a.m. - 1 a.m.

Zoup!

Monday - Friday, 10 a.m. - 6:30 p.m.

Saturday, 11 a.m. - 2 p.m.

EARLE RAYMOND HEDRICK LECTURE SERIES

EARLE RAYMOND HEDRICK LECTURE SERIES

Nonlinear Dispersive Equations and the Beautiful Mathematics That Comes with Them**Gigliola Staffilani***Massachusetts Institute of Technology***LECTURE 1: THURSDAY, AUGUST 2, 11:00 A.M. – 11:50 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING****LECTURE 2: FRIDAY, AUGUST 3, 10:30 A.M. – 11:20 A.M. PLAZA BALLROOM A, B, & C, PLAZA BUILDING****LECTURE 3: SATURDAY, AUGUST 4, 10:00 A.M. – 10:50 A.M. PLAZA BALLROOM A, B, & C, PLAZA BUILDING**

In these lectures I will give an overview of the rich mathematical structures that characterize the wave solutions of some of the most important nonlinear partial differential equations, such as the Schrödinger equation. In doing so I will illustrate how beautiful pieces of mathematics, developed using different tools, not just coming from analysis, have been generated over the years in order to answer some of the most fundamental questions for these equations, such as existence and uniqueness of solutions for example. Along the way I will formulate open questions and possible new directions of investigation.

Gigliola Staffilani Biography

Gigliola Staffilani is the MIT Abby Rockefeller Mauze' Professor of Mathematics since 2007. She received the B.S. equivalent from the University of Bologna in 1989, and the M.S. and Ph.D. degrees from the University of Chicago in 1991 and 1995. Following a Szegő Assistant Professorship at Stanford, she had faculty appointments at Stanford, Princeton and Brown, before joining the MIT mathematics faculty in 2002. At Stanford, Professor Staffilani received the Harold M. Bacon Memorial Teaching Award in 1997, and was given the Frederick E. Terman Award for young faculty in 1998. She was a member of the Institute for Advanced Study in 1995-96 and again in 2003-04. She was a Sloan Fellow from 2000-02 and a Fellow at the Radcliffe Institute for Advanced Study at Harvard in 2009-10. In 2013 she became an AMS Fellow and a member of the Massachusetts Academy of Sciences. In 2014 she was inducted into the American Academy of Arts and Sciences. In 2017 she received a Guggenheim Fellowship and a Simons Fellowship. In 2017 she also received an inaugural MITx Prize for Teaching and Learning in MOOCs.

Earle Raymond Hedrick Lecture Series History

The Earle Raymond Hedrick Lectures was established by the Board of Governors of The Mathematical Association of America at their meeting in St. Louis in 1952. Its purpose is to present to the Association a lecturer of known skill as an expositor of mathematics, "who will present a series of at most three lectures accessible to a large fraction of those who teach college mathematics." These lectures are named for the first President of the MAA, Earle Raymond Hedrick, who was also President of the American Mathematical Society from 1929 to 1930. Hedrick was born in Union City, Indiana in 1876. He attended the University of Michigan (B.A. 1896) and Harvard University (A.M. 1898), before getting his Ph.D. at Göttingen in 1901. He taught at Yale and the University of Missouri before becoming head of the Mathematics Department at the University of California at Los Angeles, where he eventually became Vice President and Provost. His mathematical research was in the areas of differential equations, calculus of variations, and functions of a real variable. Generations of mathematics students remember him as a translator of Goursat's Cours d'Analyse. In addition to research papers and works on the teaching of mathematics and engineering at the college and university level, he also wrote and edited a series of secondary school texts. He is one of six who have been President of both the AMS and the MAA. Professor Hedrick died in 1943.

Recent Speakers

- 2017: Dusa McDuff, Barnard College, Columbia University
- 2016: Hendrik Lenstra, Universiteit Leiden
- 2015: Karen Smith, University of Michigan Ann Arbor
- 2014: Bjorn Poonen, Massachusetts Institute of Technology
- 2013: Olga Holtz, University of California-Berkeley and Technische Universität Berlin
- 2012: Bernd Sturmfels, University of California-Berkeley
- 2011: Manjul Bhargava, Princeton University
- 2010: Robert L. Devaney, Boston University
- 2009: Ravi Vakil, Stanford University
- 2008: Erik Demaine, Massachusetts Institute of Technology



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sketch question

Sketch a graph of a function f that satisfies the following conditions: $\lim_{x \rightarrow -\infty} f(x) = 2$,
 $\lim_{x \rightarrow 0^-} f(x) = -\infty$, $\lim_{x \rightarrow 0^+} f(x) = \infty$,
 $\lim_{x \rightarrow \infty} f(x) = 0$.

✕ Clear sketch Submit response

In-Class Sketching Question

multiple choice question

True or False. As x increases to 100, $f(x) = \frac{1}{x}$ gets closer and closer to 0, so the limit as x goes to 100 of $f(x)$ is 0. Be prepared to justify your answer.

A.

False

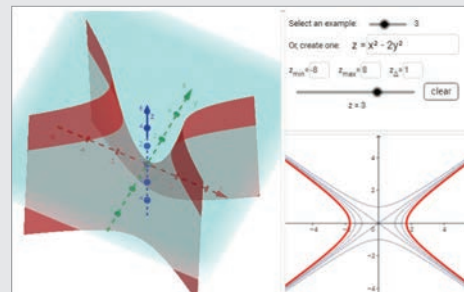
B.

True

[Send a message to the instructor](#)

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INVITED ADDRESSES

AMS-MAA JOINT INVITED ADDRESS

Gravity's Action on Light: A Mathematical Journey

Arlie Petters

Duke University

THURSDAY, AUGUST 2, 10:00 A.M. – 10:50 A.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING

The gravitational fields of stars, black holes, and galaxies act on light propagating near them, casting magnification patterns in space. Such optical phenomena have wide-ranging physical applications, including detecting extrasolar planets and testing for a fifth dimension of the universe. Assuming no background in astrophysics or cosmology, this talk will take you on a mathematical journey unveiling the intriguing properties of these beautiful magnification patterns.



MAA INVITED ADDRESS

Inclusion-exclusion in Mathematics: Who Stays in, Who Falls out, Why It Happens, and What We Should Do About It

Eugenia Cheng

School of the Art Institute of Chicago

FRIDAY, AUGUST 3, 11:30 A.M. - 12:20 P.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING

The question of why women are under-represented in mathematics is complex and there are no simple answers, only many contributing factors. I will focus on character traits, and argue that if we focus on this rather than gender we can have a more productive and less divisive conversation. To try and focus on characters rather than genders I will introduce gender-neutral character adjectives "ingressive" and "congressive" to replace masculine and feminine. I will share my experience of teaching congressive abstract mathematics to art students, in a congressive way, and the possible effects this could have for everyone in mathematics, not just women. I will present the field of Category Theory as a particularly congressive subject area, accessible to bright high school students, and contrast it with the types of math that are often used to push or stimulate those students. No prior knowledge will be needed.



MAA INVITED ADDRESS

Snow Business: Scientific Computing in the Movies and Beyond

Joseph Teran

University of California Los Angeles

SATURDAY, AUGUST 4, 11:00 A.M. - 11:50 A.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING

New applications of scientific computing for solid and fluid mechanics problems include simulation of virtual materials in movie visual effects and virtual surgery. Both disciplines demand physically realistic dynamics for materials like water, smoke, fire, and soft tissues. New algorithms are required for each area. Teran will speak about the simulation techniques required in these fields and will share some recent results including: simulated surgical repair of biomechanical soft tissues; extreme deformation of elastic objects with contact; high resolution incompressible flow; and clothing and hair dynamics. He will also discuss a new algorithm used for simulating the dynamics of snow in Disney's animated feature film, "Frozen".



MAA INVITED ADDRESS

Mathematical Medicine: Modeling Disease and Treatment

Lisette de Pillis

Harvey Mudd College

THURSDAY, AUGUST 2, 9:00 A.M. - 9:50 A.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Immune system dynamics have proven to play an increasingly central role in the development of new treatment strategies for immune-related diseases such as type 1 diabetes and certain cancers. The critical importance of the immune system in fighting such diseases has been verified clinically, as well as through mathematical models.



Many open questions remain, however, including what may lead to non-uniform patient responses to treatments, and how to optimize and personalize therapy strategies. Mathematical models can help to provide insights into the mechanisms that may be influencing patient outcomes. In this talk, we will present a sampling of mathematical models that help us to simulate immune system interactions, disease dynamics, and treatment approaches that may slow, or even stop, disease progression.

INVITED ADDRESSES

MAA JAMES R.C. LEITZEL LECTURE

The Relationship between Culture and the Learning of Mathematics

Talitha Washington

Howard University and National Science Foundation

SATURDAY, AUGUST 4, 9:00 A.M. - 9:50 A.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING



How do we ensure that our mathematics is culturally inclusive? Why have issues with minority participation not been resolved? Unfortunately, even with our best intentions, our implicit biases impact the mathematics we teach and learn. We all can take an active role to ensure the strength of our future mathematical community, which should also be a reflection of our Nation. I will share how to infuse various cultures in learning mathematics that can better help educate those of diverse backgrounds which will broaden the participation of those doing mathematics.

AWM-MAA ETTA Z. FALCONER LECTURE

Finding Ellipses

Pamela Gorkin

Bucknell University

FRIDAY, AUGUST 3, 9:30 A.M. - 10:20 A.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING



Ellipses make frequent appearances in our lives: Kepler's laws of planetary motion involve ellipses and a medical procedure involving kidney stones known as lithotripsy uses them as well. We see ellipses in architecture and in President's Park South we find a park called simply "The Ellipse." What properties of the ellipse make it so important? How can we construct an ellipse? We begin with questions like these, providing some unfamiliar answers. Then we study three seemingly unrelated problems in mathematics, chosen from linear algebra, complex analysis, and projective geometry, and we show how the solution to each of these problems relies on finding ellipses.

MAA CHAN STANEK LECTURE FOR STUDENTS

FAIL: A Mathematician's Apology

Laura Taelman

James Madison University

THURSDAY, AUGUST 2, 1:30 P.M. - 2:20 P.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING



The job of being a mathematician primarily consists of long periods of failure punctuated by short bursts of success which later seem to be somewhat obvious...but that's what we love about it! And, as it turns out, 3D printing kind of works the same way. In this talk we'll take a journey through many mathematical and 3D printing failures and try to laugh about it the best we can.

PI MU EPSILON J. SUTHERLAND FRAME LECTURE

The Singular Uniformity of Large Random Systems

Peter Winkler

Dartmouth College

WEDNESDAY, AUGUST 1, 8:00 P.M. - 8:50 P.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING



A random structure could be anything, yet somehow, when that structure is composed of many small parts, it often turns out to be shockingly predictable---at least, in a probabilistic sense. A random graph on a million vertices, for example, has a long list of characteristics each with high probability.

In an attempt to understand this phenomenon, we'll take a little tour from zero-one laws to variational principles, contrasting graphs and permutations along the way.

INVITED ADDRESSES CONTINUED

NAM DAVID HAROLD BLACKWELL LECTURE

Continuous, Discrete, or Somewhere in Between: An Introduction to Time Scales with Applications

Raegan Higgins

Texas Tech University

**FRIDAY, AUGUST 3, 1:30 P.M. - 2:20 P.M.
PLAZA BALLROOM A, B, & C, PLAZA BUILDING**



Since Stefan Hilger's landmark paper in 1988, progress has been made in the unification and extension of discrete and continuous analysis. The broad idea is to prove a result once for a dynamic equation where the domain of the unknown function is a time scale T , which is an arbitrary, nonempty, closed subset of the real numbers.

In this talk, we will use the exponential function e^{at} to introduce the theory of time scales. Considering a certain second-order linear delay dynamic equation, we establish some sufficient conditions which ensure that every solution oscillates. The obtained results unify the oscillation of second-order delay differential and difference equations.

Our interest in delay equations has lead us to study a certain area of mathematical physiology. We are using mathematical models to understand how behavioral disruption of the circadian clock can lead to glucose dysregulation. In this talk, we present some preliminary results.

INVITED PAPER SESSIONS

INVITED PAPER SESSION

Bridging Network Science and Graph Theory

THURSDAY, AUGUST 2, 1:30 P.M. - 4:20 P.M., GRAND BALLROOM II, TOWER BUILDING

The current session aims at bringing together researchers from different areas to learn or apply their knowledge to network science. While the foundations of Network science are in graph theory, the discipline evolved to include sociologists, computer scientist and others that are interested in understanding and analyzing social networks, technological network, biological networks and networks of information. The network science field bloomed as big data emerged, yet mathematicians are a minority at these conferences. The types of contributions for this session are either state-of-the art overviews of network science research topics, or newly developed theory/applications in network science that is of interest to the mathematical community.

Organizer:

Raluca Gera, *Naval Postgraduate School*

Teaching Graph Theory and Network Science

1:30 P.M. - 1:50 P.M.

Raluca Gera, *Naval Postgraduate School*

Teaching Network Science at Different Academic Levels

2:00 P.M. - 2:20 P.M.

Jon Roginski, *United States Military Academy*

Guessing Numbers of Graphs

2:30 P.M. - 2:50 P.M.

Puck Rombach, *University of Vermont*

Tropical Principal Component Analysis and its Application to Phylogenetics

3:00 P.M. - 3:20 P.M.

Ruriko Yoshida, *Naval Postgraduate School*

Using Machine Learning to Classify and Characterize Networks

3:30 P.M. - 3:50 P.M.

Karl Schmitt, *Valparaiso University*

Seeing Red: Locating People of Interest in Dark Networks

4:00 P.M. - 4:20 P.M.

Pivithuru Wijegunawardana

Category Theory for All

SATURDAY, AUGUST 4, 1:30 P.M. - 4:20 P.M., PLAZA BALLROOM D, PLAZA BUILDING

Category theory can be thought of as being “very abstract algebra”. It is typically taught at graduate school or in some select cases to advanced undergraduates. In this session we will show ways in which category theory can be taught in a meaningful way to undergraduates and those without particular aptitude or expertise in math, even high school and middle school students. In the process, we will emphasize important aspects of mathematics that are not to do with solving problems, proving theorems, or getting the right answer, including: making connections between different situations, illuminating deep structures, finding fundamental reasons for things, and improving the clarity of our thinking. The talks will be of interest for general enrichment as well as pedagogy.

Organizer:

Eugenia Cheng, *School of the Art Institute of Chicago*

Making Distinctions: Interpreting the Notion of Sameness

1:30 P.M. - 2:05 P.M.

Alissa Crans, *Loyola Marymount University*

Social Choice and Functoriality

2:15 P.M. - 2:50 P.M.

Sarah Yeakel, *University of Maryland*

Unifying Different Worlds in Mathematics

3:00 P.M. - 3:35 P.M.

Angélica Osorno, *Reed College*

From Arithmetic to Category Theory

3:45 P.M. - 4:20 P.M.

Emily Riehl, *Johns Hopkins University*

Modeling Biological Rhythms

FRIDAY, AUGUST 3, 1:30 P.M. - 4:50 P.M., PLAZA BALLROOM E, PLAZA BUILDING

Periodic oscillations are a characteristic feature of many living systems. Cells, organs, and whole organisms often exhibit regular clock-like behavior. Examples include circadian rhythms, heartbeats, brain waves, and the synchronization of behaviors across populations. Researchers seek to understand how these oscillations are generated, how they interact with external cues, and how they persist in the presence of noise.

INVITED PAPER SESSIONS CONTINUED

Mathematical modeling has proven to be an invaluable tool for investigating biological rhythms. Drawing on the theory of dynamical systems, mathematical biologists have made important contributions to understanding the structure and behavior of biological oscillators. In addition, these systems are a rich source of topics for classroom explorations and student research projects.

Speakers in this IPS will illustrate the breadth of biological questions and mathematical techniques that are used to study the rhythms of life. They will highlight recent advances and open questions.

Organizer:

David Brown, *The Colorado College*

Order Emerging from Chaos: The Mathematics of Firefly Synchronization

1:30 P.M. - 1:50 P.M.

Matthew Mizuhara, *The College of New Jersey*

Optimizing Flexibility in the Collective Decisions of Honeybees

2:00 P.M. - 2:20 P.M.

Subekshya Bidari, *University of Colorado*

Patterns of Collective Oscillations: Effects of Modularity and Time-Delay

2:30 P.M. - 2:50 P.M.

Per Sebastian Skardal, *Trinity College*

Establishing a Theoretical Framework for Ultradian Forced Desynchrony Protocols

3:00 P.M. - 3:20 P.M.

Nora Stack, *Colorado School of Mines*

Multiple Time Scale Bursting Dynamics and Complex Bursting Patterns in Respiratory Neuron Models

3:30 P.M. - 3:50 P.M.

Yangyang Wang, *The Ohio State University*

Quasicycles in the Stochastic Hybrid Morris-Lecar Neural Model

4:00 P.M. - 4:20 P.M.

Heather Zinn Brooks, *University of Utah*

Investigation of Calcium Dynamics in Astrocytes via Bifurcation Analysis

4:30 P.M. - 4:50 P.M.

Greg Handy, *University of Utah*

Strategies to Synergize Culture in the Learning and Doing of Mathematics

SATURDAY, AUGUST 4, 1:30 P.M. - 3:20 P.M., PLAZA BALLROOM E, PLAZA BUILDING

How do we embed various cultures into the learning and doing of mathematics? What are the ways that we can enhance the learning of mathematics through culturally-responsive teaching? Mathematics grounded in the African American, Latinx, and Native American traditions as well as other international traditions can stimulate connections and a sense of belonging in the mathematical community. Presenters will provide implementable strategies to synergize culture in the learning and the doing of mathematics. By infusing various cultures into our mathematics, we enhance the learning experience as well as broaden the inclusion of those doing mathematics.

Organizer:

Talitha Washington, *Howard University and the National Science Foundation*

Importance of Culture in Indigenous Learning of Mathematics

1:30 P.M. - 1:50 P.M.

Bob Megginson, *University of Michigan*

Using Computer Modeling to Integrate Culture & Mathematics

2:00 P.M. - 2:20 P.M.

Jacqueline Leonard, *University of Wyoming*

Diary of a Black Mathematician: From Research I to Liberal Arts

2:30 P.M. - 2:50 P.M.

Edray Goins, *Pomona College*

Rehumanizing Mathematics: Should That Be Our Goal?

3:00 P.M. - 3:20 P.M.

Rochelle Gutiérrez, *University of Illinois*

INVITED PAPER SESSIONS

The MAA Instructional Practices Guide in Action

THURSDAY, AUGUST 2, 3:00 P.M. - 5:30 P.M., PLAZA BALLROOM E, PLAZA BUILDING

The goal of the session is to bring the new MAA Instructional Practices (IP) Guide to life for the mathematical community. Talks will demonstrate how members of the community are using the IP Guide in their classroom practice or for professional development.

Organizers:

Martha Abell, *Georgia Southern University*

Carolyn Yackel, *Mercer University*

Professional Development for Collegiate Instructors with the MAA Instructional Practices Guide

3:00 P.M. - 3:20 P.M.

Hortensia Soto, *University of Northern Colorado*

Graduate Teaching Assistant Development via the MAA Instructional Practices Guide

3:30 P.M. - 3:50 P.M.

Gulden Karakok, *University of Northern Colorado*

Developing Persistence in Problem Solving in relation to the MAA Instructional Practices Guide

4:00 P.M. - 4:20 P.M.

Angie Hodge, *Northern Arizona University*

Paired Board Work is Definitely Not Bored Work

4:30 P.M. - 4:50 P.M.

April D. Strom, *Scottsdale Community College*

Five Essential Elements for Cooperative Learning described in the MAA Instructional Practices Guide

5:00 P.M. - 5:20 P.M.

James A. Mendoza Álvarez, *The University of Texas at Arlington*

AWM-MAA INVITED PAPER SESSION

Geometric Ideas and Where to Find Them

FRIDAY, AUGUST 3, 1:30 P.M. - 4:20 P.M., PLAZA BALLROOM D, PLAZA BUILDING

Results from geometry have long captivated the attention of mathematicians because of the surprising beauty, wide utility, and intriguing proofs behind the results. Geometric concepts are often a thread connecting areas of mathematics as well as a link between mathematics and other fields. In this session, we focus on new ways of looking at geometric theorems as well as applications to various fields of mathematics, including linear algebra, complex analysis, and dynamics.

Organizer:

Ulrich Daepp, **Pamela Gorkin**, and **Karl Voss**,

Bucknell University

String Art and Calculus

1:30 P.M. - 1:50 P.M.

Greg Quenell, *State University of New York, Plattsburgh*

From Benford's Law to Poncelet's Theorem

2:00 P.M. - 2:20 P.M.

Karl Voss, *Bucknell University*

Ellipses ...

2:30 P.M. - 2:50 P.M.

Dan Kalman, *American University*

Geometry of the Earth and Universe

3:00 P.M. - 3:20 P.M.

Sarah Greenwald, *Appalachian State University*

The Graphic Nature of Gaussian Periods

3:30 P.M. - 3:50 P.M.

Sephan Garcia, *Pomona College*

Gaining Perspective on Homographies

4:00 P.M. - 4:20 P.M.

Annalisa Crannell, *Franklin & Marshall College*

MAA PRIZE SESSION



Friday, August 3

8:30 AM- 9:10 AM, PLAZA BALLROOM A, B, C, CONCOURSE LEVEL, PLAZA BUILDING

This session is organized by James Sellers, Pennsylvania State University, MAA Secretary, and is moderated by Deanna Haunsperger, Carleton College, MAA President.

CARL B. ALLENDOERFER AWARDS

Fumiko Futamura, *Southwestern University* and **Robert Lehr**, *University of Texas School of Architecture*; "A New Perspective on Finding the Viewpoint," *Mathematics Magazine*, Volume 90, Number 4, October 2017, Pages 267-277.

TREVOR EVANS AWARD

James Propp, *University of Massachusetts Lowell*; "The Paintball Party," *Math Horizons*, Volume 25, Number 2, November 2017, Pages 18-21

THE PAUL R. HALMOS-LESTER R. FORD AWARDS

Paul E. Becker, *Pennsylvania State University Behrend*; **Martin Derka**, *Car Media 2.0*; **Sheridan Houghten**, *Brock University* & **Jennifer Ulrich**, *Pennsylvania State University Behrend*; "Build a Sporadic Group in Your Basement", *The American Mathematical Monthly*, Volume 124, Number 4, April 2017, Pages 291-305.

Francis E. Su, *Harvey Mudd College*; "Mathematics for Human Flourishing," *The American Mathematical Monthly*, Volume 124, Number 6, June-July 2017, Pages 483-493.

Michael F. Barnsley, *Australian National University* & **Andrew Vince**, *University of Florida*; "Self-Similar Polygonal Tiling," *The American Mathematical Monthly*, Volume 124, Number 10, December 2017, Pages 905-921.

Maria Deijfen, *Stockholm University*; **Alexander E. Holroyd** & **James B. Martin**, *University of Oxford*; "Friendly Frogs, Stable Marriage, and the Magic of Invariance," *The American Mathematical Monthly*, Volume 124, Number 5, May 2017, Pages 387-402.

GEORGE PÓLYA AWARDS

Ben Blum-Smith, *TED Resident* & **Samuel Coskey**, *Boise State University*; "The Fundamental Theorem on Symmetric Polynomials: History's First Whiff of Galois Theory," *The College Mathematics Journal*, Volume 48, Number 1, January 2017, Pages 18-29.

Stephen Kaczowski, *South Carolina Governor's School for Science and Mathematics*; "Mathematical Models for Global Mean Sea Level Rise," *The College Mathematics Journal*, Volume 48, Number 3, May 2017, Pages 162-169.

DANIEL SOLOW AUTHOR'S AWARD

Beth Chance, *Cal Poly San Luis Obispo*; **George Cobb**, *Mt Holyoke*; **Allan Rossman**, *Cal Poly San Luis Obispo*; **Soma Roy**, *Cal Poly San Luis Obispo*; **Todd Swanson**, *Hope College*; **Nathan Tintle**, *Dordt College*; and **Jill VanderStoep**, *Hope College*

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CONGRATULATIONS

Congratulations to our MAA members celebrating 25 or more years of membership.

Please join your colleagues at the President’s Jubilee on Thursday, August 2, 7:00 p.m - 8:30 p.m. in Grand Ballroom I for an evening of musical performances by members celebrating members of the Mathematical Association of America. This event is free and open to all MAA MathFest attendees. All MAA members, new, and those celebrating their 25th and 50th anniversaries are encouraged to attend.

25 Years

- Charlie Ragozzine
- Dave Kung
- Eugene Boman
- Gavin LaRose
- Joanna Ellis-Monaghan
- Kathy Pendleton

26 Years

- Charlie Smith
- Linda McGuire
- Stuart Boersma
- Tim Chartier
- William Ardis

27 Years

- Chip Hoke
- Dora Ahmadi
- Tamara Lakins

28 Years

- Abraham Mantell
- Afshin Ghoreishi
- Curtis Bennett
- Ed Lamagna
- George Heine
- Janet Beery
- Jennifer Beineke

29 Years

- Jenny McNulty
- Krysi Leganza
- Martha Abell
- Mike Jacobson
- Paul Coe
- Sarah Greenwald
- Bela Bajnok
- Clare Hemenway
- Jack Bookman
- Jenny Quinn
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- Michael Dorff
- Nell Rayburn
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30 Years

- Annalisa Crannell
- Elizabeth Droel
- Hortensia Soto
- James Sellers
- Janet Barnett
- Janet Nichols
- John Wierman
- Kyle Riley
- Maria Zack
- William Calhoun

31 Years

- Chuck Lindsey
- Edward Aboufadel
- Erica Flapan
- Jenna Carpenter
- Michael Boardman
- Michael Jones
- Nitsa Movshovitz-Hadar
- Pamela Pierce
- Steven Schlicker

32 Years

- Colleen Vachuska
- Deanna Haunsperger
- Frank Farris
- Gary Raduns
- Tom Richmond

33 Years

- Bruce Burdick
- Colin Adams
- Matthew Haines
- Michael Beals
- Pam Crawford
- Paul Olson
- Robert Styer
- Susan Schwartz Wildstrom

34 Years

- Benjamin Collins
- Dan Ullman
- John Cade
- T Christine Stevens
- Therese Shelton
- Michael Pearson

35 Years

- Art Benjamin
- Jay Schiffman
- Michael Barnsley

36 Years

Dan Hrozencik
 Jerry Lodder
 Jim Conklin
 Kathy Hoke
 Leon Hall
 Peter Vachuska
 Rick Gillman
 Steve Kennedy
 Doug Ensley

37 Years

Carol Schumacher
 Jim Freeman
 Mark Schwartz
 Michael Hvidsten
 Michael Scanlon
 Rick Cleary
 Robert Sefton Smith
 Suzanne Dorée

38 Years

Robert Devaney

39 Years

Bob Megginson
 David Housman
 David Scott
 Raegan Higgins
 Robert Rogers

40 Years

Jeffrey Clark

41 Years

Dan Kalman
 Kathleen Shannon
 Susan Colley

42 Years

Daniel Otero
 David Bressoud
 Jim Daniel
 Ted Sundstrom

43 Years

Gerard Venema
 Jimmy Buchanan
 Michael Starbird

44 Years

Jim Langan
 Norm Richert
 Paul Zorn
 Tom Sibley

45 Years

Charles Toll
 Donna Beers
 Jean M Horn
 Jon Johnson
 Michael P. Cohen
 Russell Howell

46 Years

Jean Bee Chan
 Trudy Cunningham
 William Feldman

47 Years

Amy Cohen
 David Carothers
 Jonathan Kane
 Steven Bellenot
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48 Years

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 Philip Yasskin
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49 Years

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 Philip Straffin
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Albert Lewis
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Eileen Poiani
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53 Years

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57 Years

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62 Years

Kenneth Ross

64 Years

Ben Fusaro

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2017–2018*

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COMMITTEE MEETINGS

Tuesday, July 31

Board of Directors

3:00 P.M. - 9:00 P.M., MAA SUITE

Meetings Management Committee (MMC)

1:00 P.M. - 2:30 P.M., MAA SUITE

Wednesday, August 1

MAA Congress Meeting

8:30 A.M. - 5:00 P.M., SILVER ROOM, TOWER BUILDING

Committee on Undergraduate Student Activities (CUSA)

2:30 P.M. - 4:00 P.M., SPRUCE ROOM, TOWER BUILDING

Thursday, August 2

Committee on Sections

7:30 A.M. - 9:00 A.M., COLORADO ROOM, TOWER BUILDING

Committee on Minicourses

8:00 A.M. - 9:00 A.M., SPRUCE ROOM, TOWER BUILDING

Committee on Professional Development

8:00 A.M. - 9:00 A.M., GOLD ROOM, TOWER BUILDING

MAA Focus Editorial Board

8:00 A.M. - 9:00 A.M., CENTURY ROOM, TOWER BUILDING

Committee on SIGMAAs

12:30 P.M. - 2:00 P.M., COLORADO ROOM, TOWER BUILDING

Committee on Faculty and Departments

1:00 P.M. - 2:30 P.M., GOLD ROOM, TOWER BUILDING

Membership Committee

2:00 P.M. - 3:30 P.M., SPRUCE ROOM, TOWER BUILDING

Section Officers Meeting

3:00 P.M. - 5:00 P.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

American Mathematical Monthly Editorial Board

2:15 P.M. - 3:15 P.M., CENTURY ROOM, TOWER BUILDING

Curriculum Renewal Across the First Two Years (CRAFTY)

3:30 P.M. - 5:00 P.M., COLORADO ROOM, TOWER BUILDING

All Publications Meeting

4:30 P.M. - 5:30 P.M., CENTURY ROOM, TOWER BUILDING

COMMITTEE MEETINGS CONTINUED

Friday, August 3

Committee for Early-Career Mathematicians (ECM Committee)

7:30 A.M. - 8:00 A.M., SPRUCE ROOM, TOWER BUILDING

Council on Members and Communities

12:30 P.M. - 2:00 P.M., COLORADO ROOM, TOWER BUILDING

Committee on the Undergraduate Program in Mathematics (CUPM)

2:00 P.M. - 4:00 P.M., SPRUCE ROOM, TOWER BUILDING

Council on Meetings and Professional Development

3:30 P.M. - 5:00 P.M., GOLD ROOM, TOWER BUILDING

Committee on Graduate Students

4:00 P.M. - 5:30 P.M., SPRUCE ROOM, TOWER BUILDING

Committee on the Teaching of Undergraduate Mathematics

4:00 P.M. - 5:30 P.M., CENTURY ROOM, TOWER BUILDING

Council on Programs and Students (COPS)

4:30 P.M. - 5:30 P.M., COLORADO ROOM, TOWER BUILDING

Saturday, August 4

StatPREP Project Team Meeting

9:00 A.M. - 11:00 A.M., COLORADO ROOM, TOWER BUILDING

Committee on Committees & Councils (COCC)

12:00 P.M. - 2:00 P.M., MAA SUITE

MAA Business Meeting

1:00 P.M. - 1:20 P.M., PLAZA BALLROOM D, PLAZA BUILDING

What's New in the MAA Pavilion

Come check out some of the exciting events happening in the MAA Pavilion. These special events are for members by members. There's something for everyone. It's the perfect time to connect with new and old colleagues. See you there!

- ▶ **On-the-Spot Caricature Paintings**
Wednesday, Aug. 1, 6:00 pm - 7:00 pm
ORGANIZER: MAA Author, John de Pillis
- ▶ **Meet the New SIGMAA-Rec**
Wednesday, Aug. 1, 7:00 pm - 8:00 pm
ORGANIZER: SIGMAA on Recreational Mathematics, Robert Vallin
- ▶ **Sections Connecting with BIG**
Thursday, Aug. 2, 12:00 PM - 12:30 PM
ORGANIZER: Committee on Sections, Lisa Marano
- ▶ **Online Demonstration of MAA Journals Platform**
Thursday, Aug. 2, 1:00 PM - 1:30 PM
ORGANIZER: Taylor & Francis Group, Thomas Elrod
- ▶ **Meet the New SIGMAA-Rec**
Thursday, Aug. 2, 2:30 PM - 3:00 PM
ORGANIZER: SIGMAA on Recreational Mathematics, Robert Vallin
- ▶ **Ignite your Passion for Publishing in MAA Journals**
Thursday, Aug. 2, 3:30 PM - 4:00 PM
ORGANIZERS: MAA Journal Editors, Susan Jane Colley, Brian Hopkins, Michael Jones, Bonnie Ponce, and Dominic Klyve
- ▶ **Membership Committee Meet & Greet**
Thursday, Aug. 2, 4:30 PM - 5:00 PM
ORGANIZERS: Committee on Membership, Kira Hamman and Stephen Coolbaugh
- ▶ **Math Busking**
Friday, Aug. 3, 12:30 PM - 1:00 PM
ORGANIZERS: Tim and Tanya Chartier, and Axel Brandt
- ▶ **Sharing Great Ideas**
Friday, Aug. 3, 2:30 PM - 3:00 PM
ORGANIZER: MAA FOCUS Editor, Jacqueline Jensen-Vallin
- ▶ **What's the Figure Skating Blade Radius?**
Friday, Aug. 3, 3:00 PM - 3:30 PM
ORGANIZER: SIGMAA on Sports, Diana Chengy
- ▶ **Early Career Mathematicians Reception**
Friday, Aug. 3, 4:00 PM - 5:00 PM
ORGANIZER: PosterFest, Lisa Driskell



Be sure to visit the MAA Pavilion for a complete list of other activities, raffles, and to purchase the new MAA T-Shirt!

#MAAthFest

CHRONOLOGICAL SCHEDULE

Wednesday, August 1

Workshop

Data Science and the Mathematics Department 1:00 P.M. - 5:00 P.M., GOVERNOR'S SQUARE 15, PLAZA BUILDING

Please note: This event is offered at an additional fee to general registration. Advance registration is required to attend.

Data science and big data are terms that are prevalent today, and this trend is likely to continue with the ever-increasing proliferation of data. Students with background in this area have tremendous opportunities for jobs, and university departments from life science to business are creating data science courses and programs. In this workshop, we will discuss how mathematics, math courses, and math departments fit into this situation. Specifically, we will discuss the following questions:

- What is data science?
- What are some models for programs in data science housed within mathematics departments?
- How might data science programs outside of mathematics departments apply pressure to change mathematics departments courses?
- How can a department successfully navigate this change and have the growth in data science be an opportunity for strengthening the mathematics department?

Sponsors:

Committee on the Undergraduate Program in Mathematics (*CUPM - chair, Michael Boardman*)

Preparing for Industrial Careers in the Mathematical Sciences Project (*PIC Math - MAA lead, Michael Dorff*)

Registration

3:00 P.M. - 8:00 P.M., PLAZA REGISTRATION, PLAZA BUILDING

SESSION FOR UNDERGRADUATE STUDENTS MAA-PME Student Reception

4:15 P.M. - 5:15 P.M., WINDOWS ROOM, TOWER BUILDING

Undergraduate students are invited to come for refreshments and a welcome to MathFest.

SESSION FOR UNDERGRADUATE STUDENTS Math Jeopardy

5:30 P.M. - 6:15 P.M., PLAZA BALLROOM E, PLAZA BUILDING

Answer: A fun undergraduate mathematics contest to lead off MathFest.

Question: What is Mathematics Jeopardy?

Four teams of students will provide the questions to go with the mathematical answers in many categories. All interested students in the audience can enter their names to be chosen to play on one of the four teams of four players. There will be prizes for all the participants.

Come cheer for your favorite team. The session will be emceed by Michael Berry.

Organizers:

Robert W. Vallin, *Lamar University*

Michael W. Berry, *University of Tennessee*

SOCIAL EVENT

Exhibit Hall & Grand Opening Reception

6:00 P.M. - 8:00 P.M., PLAZA EXHIBIT HALL, PLAZA BUILDING

The MAA MathFest Grand Opening Reception will launch this year's MAA MathFest on a high note. This event is intended to draw attendees together in a spirit of camaraderie. We warmly invite you to enjoy complimentary light hors d'oeuvres while you mix and mingle in the Exhibit Hall with other registered participants and guests, sponsors, and exhibitors.

INVITED ADDRESS

Pi Mu Epsilon J. Sutherland Frame Lecture

The Singular Uniformity of Large Random Systems

8:00 P.M. - 8:50 P.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Peter Winkler, *Dartmouth College*

A random structure could be anything, yet somehow, when that structure is composed of many small parts, it often turns out to be shockingly predictable—at least, in a probabilistic sense. A random graph on a million vertices, for example, has a long list of characteristics each with high probability.

In an attempt to understand this phenomenon, we'll take a little tour from zero-one laws to variational principles, contrasting graphs and permutations along the way.

CHRONOLOGICAL SCHEDULE

Thursday, August 2

Registration

8:00 A.M. - 7:00 P.M., PLAZA REGISTRATION, PLAZA BUILDING

UNDERGRADUATE STUDENT PAPER SESSION MAA Student Paper Sessions

9:00 A.M. - 10:55 A.M., PLAZA COURTS 1-4, PLAZA BUILDING

Organizers:

Eric Ruggieri, *College of the Holy Cross*
Chasen Smith, *Georgia Southern University*

UNDERGRADUATE STUDENT PAPER SESSION Pi Mu Epsilon Student Paper Sessions

9:00 A.M. - 10:55 A.M., PLAZA COURTS 5-8, PLAZA BUILDING

Organizer:

Darci Kracht, *Kent State University*

Exhibit Hall

9:00 A.M. - 5:00 P.M., PLAZA EXHIBIT HALL, PLAZA BUILDING

INVITED ADDRESS

MAA Invited Address

Mathematical Medicine: Modeling Disease and Treatment

9:00 A.M. - 9:50 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Lisette de Pillis, *Harvey Mudd College*

Immune system dynamics have proven to play an increasingly central role in the development of new treatment strategies for immune-related diseases such as type 1 diabetes and certain cancers. The critical importance of the immune system in fighting such diseases has been verified clinically, as well as through mathematical models.

Many open questions remain, however, including what may lead to non-uniform patient responses to treatments, and how to optimize and personalize therapy strategies. Mathematical models can help to provide insights into the mechanisms that may be influencing patient outcomes. In this talk, we will present a sampling of mathematical models that help us to simulate immune system interactions, disease dynamics, and treatment approaches that may slow, or even stop, disease progression.

CONTRIBUTED PAPER SESSION

Encouraging Effective Teaching Innovation, Part A

9:00 A.M. - 11:55 A.M., GOVERNOR'S SQUARE 12, PLAZA BUILDING

This session will consist of presentations of demonstrably effective and innovative classroom techniques that address the reasoning behind, design, and implementation of resources or activities. This may include whole course techniques (not necessarily original to the presenter) or drop-in activities to bolster student learning and reflection in any course. Materials will be shared after the session at: <http://mathfest2018.davidfailing.com>

Organizers:

Susan Crook, *Loras College*
David Failing, *Lewis University*
Russ Goodman, *Central College*
Mami Wentworth, *Wentworth Institute of Technology*

Exploration of Methods in the Teaching of Pre-Calculus

9:00 A.M. - 9:15 A.M.

Keith Carlson, *University of Central Florida*

Spicing up a Developmental/First Year Algebra Classroom

9:20 A.M. - 9:35 A.M.

Gowribalan Ananda Vamadeva, *University of Cincinnati*

The Integration of Mathematics and Science: A Plan for a High School Integrated Pre-Calculus and Physics Course

9:40 A.M. - 9:55 A.M.

Courtney Fox, *Clermont Northeastern Schools*

Effective Methods for Improving Student Retention and Progression

10:00 A.M. - 10:15 A.M.

Ciarán Mac an Bhaird, *Maynooth University*

Supporting College Algebra Students' Study of Mixture and Motion Problems

10:20 A.M. - 10:35 A.M.

Erin R. Moss, *Millersville University of Pennsylvania*

Promoting the Use of Multiple Representations in the College Algebra Classroom

10:40 A.M. - 10:55 A.M.

Jordan R. Hall, *University of Colorado Denver*

TACTivities for Elementary Teachers

11:00 A.M. - 11:15 A.M.

Angie Hodge, *Northern Arizona University*

CHRONOLOGICAL SCHEDULE CONTINUED

Thursday, August 2 CONTINUED

Team-Based Learning Calculus

11:20 A.M. - 11:35 A.M.

Anna Seitz, *Iowa State University*

Heather Bolles, *Iowa State University*

Amanda Baker, *Iowa State University*

Opening Gateways: Successful Activities and STEM Applications for Algebra and Trigonometry Courses

11:40 A.M. - 11:55 A.M.

Marianna Bonanome, *New York City College of Technology*

INVITED ADDRESS

AMS-MAA Joint Invited Address

Gravity's Action on Light: A Mathematical Journey

10:00 A.M. - 10:50 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Arlie Petters, *Duke University*

The gravitational fields of stars, black holes, and galaxies act on light propagating near them, casting magnification patterns in space. Such optical phenomena have wide-ranging physical applications, including detecting extrasolar planets and testing for a fifth dimension of the universe. Assuming no background in astrophysics or cosmology, this talk will take you on a mathematical journey unveiling the intriguing properties of these beautiful magnification patterns.

INVITED ADDRESS

Earle Raymond Hedrick Lecture Series

Nonlinear Dispersive Equations and the Beautiful Mathematics That Comes with Them, Lecture I

11:00 A.M. - 11:50 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Gigliola Staffilani, *Massachusetts Institute of Technology*

In these lectures I will give an overview of the rich mathematical structures that characterize the wave solutions of some of the most important nonlinear partial differential equations, such as the Schrödinger equation. In doing so I will illustrate how beautiful pieces of mathematics, developed using different tools, not just coming from analysis, have been generated over the years in order to answer some of the most fundamental questions for these equations, such as existence and uniqueness of solutions for example. Along the way I will formulate open questions and possible new directions of investigation.

INVITED ADDRESS

MAA Chan Stanek Lecture for Students

FAIL: A Mathematician's Apology

1:30 P.M. - 2:20 P.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Laura Taelman, *James Madison University*

The job of being a mathematician primarily consists of long periods of failure punctuated by short bursts of success which later seem to be somewhat obvious...but that's what we love about it! And, as it turns out, 3D printing kind of works the same way. In this talk we'll take a journey through many mathematical and 3D printing failures and try to laugh about it the best we can.

INVITED PAPER SESSION

Bridging Network Science and Graph Theory

1:30 P.M. - 4:20 P.M., GRAND BALLROOM II, TOWER BUILDING

The current session aims at bringing together researchers from different areas to learn or apply their knowledge to network science. While the foundations of Network science are in graph theory, the discipline evolved to include sociologists, computer scientist and others that are interested in understanding and analyzing social networks, technological network, biological networks and networks of information. The network science field bloomed as big data emerged, yet mathematicians are a minority at these conferences. The types of contributions for this session are either state-of-the art overviews of network science research topics, or newly developed theory/applications in network science that is of interest to the mathematical community.

Organizer:

Raluca Gera, *Naval Postgraduate School*

Teaching Graph Theory and Network Science

1:30 P.M. - 1:50 P.M.

Raluca Gera, *Naval Postgraduate School*

Teaching Network Science at Different Academic Levels

2:00 P.M. - 2:20 P.M.

Jon Roginski, *United States Military Academy*

Guessing Numbers of Graphs

2:30 P.M. - 2:50 P.M.

Puck Rombach, *University of Vermont*

Tropical Principal Component Analysis and its Application to Phylogenetics

3:00 P.M. - 3:20 P.M.

Ruriko Yoshida, *Naval Postgraduate School*

Using Machine Learning to Classify and Characterize Networks

3:30 P.M. - 3:50 P.M.

Karl Schmitt, *Valparaiso University*

CHRONOLOGICAL SCHEDULE

Thursday, August 2 CONTINUED

Seeing Red: Locating People of Interest in Dark Networks

4:00 P.M. - 4:20 P.M.

Pivithuru Wijegunawardana

CONTRIBUTED PAPER SESSION

Advancing Women in Mathematics: On the Ground Initiatives

1:30 P.M. - 5:25 P.M., GOVERNOR'S SQUARE 14, PLAZA BUILDING

This session focuses on how programs advancing women in mathematics take shape on the ground. Speakers will discuss critical project components including aims, intended audience, implementation, replication, and scaling. This session provides a broad array of ideas that together form a frame for how to begin—or continue—a dedicated effort to move women forward in mathematics.

Organizers:

Della Dumbaugh and Heather Russell, *University of Richmond*

Being Intentional: Increasing Success of Women in the Mathematics Program at GVSU

1:30 P.M. - 1:45 P.M.

Lauren Keough, *Grand Valley State University*
Feryal Alayont, *Grand Valley State University*

The WoMentoring Group

1:50 P.M. - 2:05 P.M.

Felicia Tabing, *University of Southern California*
Cindy Blois, *University of Southern California*

The Career Mentoring Workshop (CaMeW)

2:10 P.M. - 2:25 P.M.

Rachelle DeCoste, *Wheaton College (MA)*

Building a Community of Peers

2:30 P.M. - 2:45 P.M.

Alessandra Pantano, *University of California, Irvine*
Natalia Komarova, *University of California, Irvine*
Patrick Guidotti, *University of California, Irvine*

Leveling Up: Building Community and Confidence

2:50 P.M. - 3:05 P.M.

Heather M. Russell, *University of Richmond*
Della Dumbaugh, *University of Richmond*

INCLUDES WATCH-US Mini-grant: C3PO (Core knowledge, Community, and Confidence through a Programming Overview)

3:10 P.M. - 3:25 P.M.

Rebecca Segal, *Virginia Commonwealth University*

Mentoring, Outreach, and Professional Development: Activities of the AWM Student Chapter at UNC-Chapel Hill

3:30 P.M. - 3:45 P.M.

Katrina Morgan, *University of North Carolina at Chapel Hill*
Francesca Bernardi, *University of North Carolina at Chapel Hill*

Women Empowered through Graduate Opportunities Awareness Transformation (weGOAT)

3:50 P.M. - 4:05 P.M.

Kaitlyn Phillipson, *St. Edward's University*
Jason Callahan, *St. Edward's University*
Carol Gee, *St. Edward's University*

Dare to BEE

4:10 P.M. - 4:25 P.M.

Anae Myers, *Florida Atlantic University*
Catherine Berrouet, *Florida Atlantic University*
Angela Robinson, *Florida Atlantic University*
Jessica Thune, *Florida Atlantic University*
Yuan Wang, *Florida Atlantic University*

Mathematics Project at Minnesota

4:30 P.M. - 4:45 P.M.

Alice Nadeau, *University of Minnesota*
Kim Logan, *University of Minnesota*
Harini Chandramouli, *University of Minnesota*

Hidden No More Lecture Series

4:50 P.M. - 5:05 P.M.

Alison Marr, *Southwestern University*

Developing Peer Networks by Producing Videos That Highlight the Careers of Women in Math

5:10 P.M. - 5:25 P.M.

Jessica Beck, *University of Tennessee*
Natalie Lemanski, *University of Tennessee*
Nina Fefferman, *University of Tennessee*

CONTRIBUTED PAPER SESSION

Encouraging Effective Teaching Innovation, Part B

THURSDAY, AUGUST 2, 1:30 P.M. - 6:05 P.M., GOVERNOR'S SQUARE 12, PLAZA BUILDING

Organizers:

Susan Crook, *Loras College*
David Failing, *Lewis University*
Russ Goodman, *Central College*
Mami Wentworth, *Wentworth Institute of Technology*

Building Community in the Classroom: Creating Classroom Culture and Establishing Community Norms

1:30 P.M. - 1:45 P.M.

Tian Yu Yen, *University of Colorado Denver*

CHRONOLOGICAL SCHEDULE CONTINUED

Thursday, August 2 CONTINUED

Investigation of Inverted and Active Pedagogies in STEM Disciplines: A Preliminary Report A Preliminary Report

1:50 P.M. - 2:05 P.M.

Reza O. Abbasian, *Texas Lutheran University*
 Michael L. Czuchry, *Texas Lutheran University*
 John T. Sieben, *Texas Lutheran University*

Active Learning via Fill-in-the-blank Proofs in an Intro to Proofs Course

2:10 P.M. - 2:25 P.M.

Charlotte Knotts-Zides, *Wofford College*

Projects Applying Linear Algebra to Calculus

2:30 P.M. - 2:45 P.M.

Jason Moliterno, *Sacred Heart University*

Embodied Activities: Engaging Students via Life Size Exploration

2:50 P.M. - 3:05 P.M.

Sarah A. Nelson, *Lenoir-Rhyne University*

Intentionally Integrating Prior Knowledge into Daily Lessons

3:10 P.M. - 3:25 P.M.

Kristen Sellke, *Saint Mary's University of Minnesota*

A SCALE-UP Instructional Model for Multivariate Calculus

3:30 P.M. - 3:45 P.M.

Gus Greivel, *Colorado School of Mines*
 Scott Strong, *Colorado School of Mines*

Sort The Sequences

3:50 P.M. - 4:05 P.M.

Sarah Wright, *Fitchburg State University*

Instructors' Experiences Using Primary Source Projects in Mathematics Classrooms

4:10 P.M. - 4:25 P.M.

Daniel E. Otero, *Xavier University*
 Dominic Klyve, *Central Washington University*
 Nicholas A. Scoville, *Ursinus College*
 Diana White, *University of Colorado Denver*

Engaging Students With Augmented Reality

4:30 P.M. - 4:45 P.M.

Nora Strasser, *Friends University*

Drawing-to-Learn Activity as a Cognitive Tool in Undergraduate Mathematics

4:50 P.M. - 5:05 P.M.

Mile Krajcevski, *University of South Florida*

Making Connections with Card Sorts

5:10 P.M. - 5:25 P.M.

Carrie Muir, *Whatcom Community College*

Transforming Mathematics Assessments to Drive Better Learning

5:30 P.M. - 5:45 P.M.

Lisa Bromberg, *United States Military Academy - West Point*
 Kayla Blyman, *United States Military Academy - West Point*
 Kristin Arney, *United States Military Academy - West Point*

Oral Assessments: Helping Students Make Connections

5:50 P.M. - 6:05 P.M.

Mary A. Nelson, *George Mason University*

CONTRIBUTED PAPER SESSION

Great Circles, Great Problems

1:30 P.M. - 5:05 P.M., GOVERNOR'S SQUARE 15, PLAZA BUILDING

Math Circles are outreach programs for K12 teachers and students, often led by university-based mathematicians, which focus on providing authentic mathematical experiences – where participants enjoy and engage with mathematics as a lively discipline of inquiry, conjecturing, and problem solving. Presenters will share mathematical problems and activities that can lead to hours of exploration by the curious.

Organizers:

Amanda Matson, *Clarke University*
 Diana White, *National Association of Math Circles*

Sponsor: *The SIGMAA on Math Circles for Students and Teachers (SIGMAA MCST)*

Polyominoes and Blokus

1:30 P.M. - 1:45 P.M.

Sarah Trebat-Leder, *Art of Problem Solving*

Queen Dido Problems

1:50 P.M. - 2:05 P.M.

Amanda Katharine Serenevy, *Riverbend Community Math Center*

Explore Transformations through Anamorphosis and 3D Art

2:10 P.M. - 2:25 P.M.

Mahmud Akelbek, *Weber State University*

CHRONOLOGICAL SCHEDULE

Thursday, August 2 CONTINUED

Positive Net Results: Folding and Unfolding

2:30 P.M. - 2:45 P.M.

Sarah Bryant, Dickinson College

Lance Bryant, Shippensburg University

Catapult Planning and Development Activity at the Central Oklahoma Math Circle

2:50 P.M. - 3:05 P.M.

Erica Bajo Calderon, University Of Central Oklahoma

Pythagorean Triples: Connections Between Algebra and Geometry

3:10 P.M. - 3:25 P.M.

Mark Koester, Metropolitan State University of Denver

Using Paper Folding to Create Islamic Geometric Pattern

3:30 P.M. - 3:45 P.M.

Rebin A. Muhammad, Ohio University

Math Circle at Racquet Up Detroit

3:50 P.M. - 4:05 P.M.

Ruth Favro, Lawrence Technological University

Na Yu, Lawrence Technological University

Competitive Constructions: Polyhedra, MESA, and Intuition-first

4:10 P.M. - 4:25 P.M.

James C. Taylor, Math Circles Collaborative of New Mexico

The Community Alliance for Mathematics

4:30 P.M. - 4:45 P.M.

Brianna Donaldson, American Institute of Mathematics

Discussion

4:50 P.M. - 5:05 P.M.

CONTRIBUTED PAPER SESSION

Mastery Grading, Part A

1:30 P.M. - 4:25 P.M., GOVERNOR'S SQUARE 11, PLAZA BUILDING

"Mastery grading" refers to a suite of assessment techniques that encourage students to pursue deep understanding of course content. Techniques include standards-based grading, specifications grading, and mastery testing. Grades are based on mastery of objectives rather than accumulation of partial credit. Students have multiple attempts to attain this high standard for each objective, teaching them to persevere through the course.

Organizers:

David Clark, Grand Valley State University

Robert Campbell, College of Saint Benedict and Saint John's University

Jeb Collins, University of Mary Washington

Alyssa Hoofnagle, Wittenberg University

Mike Janssen, Dordt College

Austin Mohr, Nebraska Wesleyan University

Jessica OShaughnessy, Shenandoah University

Cassie Williams, James Madison University

A Quick Summary of Four Years of Standards-Based Grading

1:30 P.M. - 1:45 P.M.

Kate Owens, College of Charleston

The Unstandardized Nature of Standards-Based Grading Practices in Middle School Mathematics Classrooms

1:50 P.M. - 2:05 P.M.

Michelle A. Morgan, University of Northern Colorado

Mastery Based Testing - A Case Study in Implementation Across a Mathematics Curriculum

2:10 P.M. - 2:25 P.M.

Chris Lee, Roanoke College

Implementing Standards-Based Grading in a Post-Secondary Mathematics Course

2:30 P.M. - 2:45 P.M.

Jane Zimmerman, Michigan State University

Does Mastery-based Testing Help with Test Anxiety? Growth Mindset? Confidence? An Analysis of the Impact of MBT in Mathematics Courses

2:50 P.M. - 3:05 P.M.

Amanda Harsy, Lewis University

Combating Test Anxiety in Under-represented Groups

3:10 P.M. - 3:25 P.M.

Jessie K. Lenarz, St. Catherine University

Kristine Pelatt, St. Catherine University

Communicating Student Progress in Standards-Based Grading

3:30 P.M. - 3:45 P.M.

Thomas Mahoney, Emporia State University

Mastery Grading for the Masses: A Public Reflection

3:50 P.M. - 4:05 P.M.

Anil Venkatesh, Ferris State University

CHRONOLOGICAL SCHEDULE CONTINUED

Thursday, August 2 CONTINUED

CONTRIBUTED PAPER SESSION

Mathematical Themes in a First-Year Seminar

1:30 P.M. - 5:05 P.M., GOVERNOR'S SQUARE 16, PLAZA BUILDING

As mathematicians, we are eager to infuse our discipline into First-Year Seminars, which often serve as an introduction to college-level academic culture (critical reading, writing and thinking, information literacy, etc.). Speakers will share their seminar's topic, major learning goals, the ways in which mathematical themes were incorporated into the seminar, and the degree to which their pedagogical choices were successful.

Organizers:

Jennifer Schaefer, Dickinson College
Jennifer Bowen, College of Wooster
Mark Kozek, Whittier College
Pamela Pierce, College of Wooster

Seminar Precalculus Through Applications

1:30 P.M. - 1:45 P.M.

Matthew J. Prudente, Saint Vincent College

Math Anxiety Investigated as a FYS

1:50 P.M. - 2:05 P.M.

Gretchen W. Whipple, Warren Wilson College

Measuring Sustainability

2:10 P.M. - 2:25 P.M.

Amanda I. Beecher, Ramapo College of New Jersey

Experiential Learning & Statistics in a First-Year Seminar Course

2:30 P.M. - 2:45 P.M.

Kathryn Cerrone, The University of Akron

Uncovering the Hidden Figures

2:50 P.M. - 3:05 P.M.

Cynthia Farthing, University of Iowa

Math and Art in a First-Year Seminar

3:10 P.M. - 3:25 P.M.

Kim Spayd, Gettysburg College

Mathematical Identities: Diverging from the Stereotypes

3:30 P.M. - 3:45 P.M.

Jennifer Schaefer, Dickinson College

A First-Year Seminar on Creativity in Mathematics

3:50 P.M. - 4:05 P.M.

Sarah Mayes-Tang, University of Toronto

Mathematics Through Fiction: Creatively Exploring Mathematical Thinking and the Nature of Mathematics

4:10 P.M. - 4:25 P.M.

Allegra B. Reiber, University of Denver

Exploring Mathematics Related Fields--A First-year Seminar for Mathematics Students

4:30 P.M. - 4:45 P.M.

Mary Shepherd, Northwest Missouri State University

Cryptology in a First Year Seminar

4:50 P.M. - 5:05 P.M.

Emlee Nicholson, Millsaps College

CONTRIBUTED PAPER SESSION

Mathematics Research Experiences for K-12 Teachers and Students

1:30 P.M. - 3:45 P.M., GOVERNOR'S SQUARE 17, PLAZA BUILDING

Presenters will share their experiences conducting mathematics research with teachers and students. Participants will be introduced to a variety of problems that are well suited for these research experiences. They will learn about the findings that have resulted from these research experiences as well as the influences on teachers' instructional practice and students' learning and dispositions toward mathematics.

Organizers:

Saad El-Zanati and Cynthia Langrall, Illinois State University

Research Experiences for PreService and InService Secondary Mathematics Teachers: The Teacher-Scholar Concept

1:30 P.M. - 1:45 P.M.

Saad El-Zanati, Illinois State University
David Barker, Illinois State University
Cynthia Langrall, Illinois State University

Translating the REU Experience to the High School Classroom: A Tale of Two Teachers

1:50 P.M. - 2:05 P.M.

Joel Jeffries, Iowa State
Stephanie Zeppetello, East Leyden High School

REU Math Camp: A Genuine Mathematics Research Experience for Urban High School Students

2:10 P.M. - 2:25 P.M.

Lindsey States, Miami University
Kerry Hawken, Ball State University

Research Conducted as Part of RET Supplements

2:30 P.M. - 2:45 P.M.

Anant Godbole, East Tennessee State University

CHRONOLOGICAL SCHEDULE

Thursday, August 2 CONTINUED

Inspiring Mathematical Research via Twitter
2:50 P.M. - 3:05 P.M.
James Tanton, *Mathematical Association of America*

Some Number Theory Research Experience with Gifted High School Students
3:10 P.M. - 3:25 P.M.
Jongryul Lim, *Korea Science Academy of KAIST*

Introducing Students in Grades 4-6 to Unsolved Problems
3:30 P.M. - 3:45 P.M.
Jenna R. O'Dell, *Bemidji State University*
Cynthia Langrall, *Illinois State University*

CONTRIBUTED PAPER SESSION

A Number is Never an Answer: Developing Mathematical Thinking and Communication Through Writing, Part A

1:30 P.M. - 5:45 P.M., GOVERNOR'S SQUARE 10, PLAZA BUILDING

Many students only experience mathematics as a discipline of calculations. However students who take a quantitative job in an interdisciplinary field need to be able to clearly communicate mathematics to a lay audience via writing. In this session we invite instructors to discuss their use of writing assignments in their mathematics courses that develop these transferable skills.

Organizers:

William Gryc and Linda McGuire, *Muhlenberg College*

Using Writing Assignments in a Quantitative Reasoning Course
1:30 P.M. - 1:45 P.M.
Paula R. Stickles, *Millikin University*

Writing With Numbers
1:50 P.M. - 2:05 P.M.
Sandra Fital-Akelbek, *Weber State University*
Jean Norman, *Weber State University*

Developing Metacognition Through Process-focused writing in an Inquiry-Based Learning Classroom
2:10 P.M. - 2:25 P.M.
Emilie Hancock, *Central Washington University*
Gulden Karakok, *University of Northern Colorado*

Incorporating Written Communications into Mathematics Deepens Students Learning Outcome in General Education Mathematics
2:30 P.M. - 2:45 P.M.
Hope Essien, *Malcolm X College*

Using Writing Ideas from English Teachers in a History of Mathematics Course
2:50 P.M. - 3:05 P.M.
Nell Rayburn, *Austin Peay State University*

Writing Short Essays in a Core Mathematics Course
3:10 P.M. - 3:25 P.M.
Abigail C. Bishop, *Iona College*
Benjamin Gaines, *Iona College*

Exploring Integral Calculus Through Applied Writing Assignments
3:30 P.M. - 3:45 P.M.
Michelle Ghrist, *Gonzaga University*

Writing through Applications in Multivariable Calculus
3:50 P.M. - 4:05 P.M.
Joy Becker, *Wartburg College*

Writing Intensive Upper Level Math Courses for Engineers and Computer Scientists
4:10 P.M. - 4:25 P.M.
Malgorzata A. Marciniak, *CUNY LaGuardia Community College*

Assessing Department SLOs in a Linear Algebra Class
4:30 P.M. - 4:45 P.M.
Maria Neophytou-Foster, *Belmont University*

Critical Thinking and Writing Development through Project and Paper Scaffolding in a Liberal Arts Math Course
4:50 P.M. - 5:05 P.M.
Karin R. Saoub, *Roanoke College*

Write, Revise, Repeat: Improving Student Writing
5:10 P.M. - 5:25 P.M.
Cory Johnson, *California State University, San Bernardino*

Writing Across the Mathematics Curriculum
5:30 P.M. - 5:45 P.M.
Jeff Johannes, *SUNY Geneseo*

CONTRIBUTED PAPER SESSION

Research in Undergraduate Mathematics Education

1:30 P.M. - 4:45 P.M., PLAZA BALLROOM D, PLAZA BUILDING

The goals of this session are to promote quality research in undergraduate mathematics education, to disseminate educational studies to the greater mathematics community, and to facilitate the impact of research findings on mathematics pedagogy. Presentations may be based on research in any undergraduate

CHRONOLOGICAL SCHEDULE CONTINUED

Thursday, August 2 CONTINUED

mathematical area. Examples include studies about students' mathematical reasoning, teaching practices, curriculum design, and faculty professional development.

Organizers:

- Megan Wawro**, *Virginia Tech*
- Aaron Weinberg**, *Ithaca College*
- Stacy Brown**, *California State Polytechnic University*

An Initial Exploration into Undergraduate Students' Computational Activity in a Combinatorial Setting

1:30 P.M. - 1:45 P.M.
Elise Lockwood, *Oregon State University*

Exploring Expert and Novice Understandings of Isomorphism and Homomorphism in Abstract Algebra

1:50 P.M. - 2:05 P.M.
Rachel L. Rupnow, *Virginia Tech*

Developing a Conceptual Model for Vector Cross Products

2:10 P.M. - 2:25 P.M.
Deborah Moore-Russo, *University at Buffalo*
Monica VanDieren, *Robert Morris University*

Specialized Knowledge of University Lecturers of Linear Algebra in Relation to Connections

2:30 P.M. - 2:45 P.M.
Diana L. Vasco Mora, *Universidad Tecnica Estatal De Quevedo*
Nuria Climent Rodríguez, *Universidad de Huelva*

Productive Failure in the Undergraduate Flipped Mathematics Classroom

2:50 P.M. - 3:05 P.M.
John A. Kerrigan, *Rutgers University*

Faculty Feedback on Student Proofs

3:10 P.M. - 3:25 P.M.
Jim Brandt, *Southern Utah University*
Gretchen Rimmasch Meilstrup, *Southern Utah University*

Learning to Prove through Students' Eyes: The Case of Proof by Contradiction

3:30 P.M. - 3:45 P.M.
Tim Hendrix, *Meredith College*
Karen Keene, *North Carolina State University*

Online Homework: What Students Think and What Students Do

3:50 P.M. - 4:05 P.M.
Benjamin D. Sencindiver, *Colorado State University*
Mary Pilgrim, *Colorado State University*

Constructing Formulas from Dynamic Images: What Happens When Nothing Stays the Same?

4:10 P.M. - 4:25 P.M.
Kristin Frank, *Towson University*

A Fine-grained analysis of Developmental Mathematics Students' Background Mathematics Knowledge Using MDTP's Second Year Algebra Readiness Test

4:30 P.M. - 4:45 P.M.
Eyob Demeke, *California State University, Los Angeles*

PANEL SESSION

Advocating for Your Career and Yourself

1:30 P.M. - 2:50 P.M., PLAZA BALLROOM F, PLAZA BUILDING

From asking for a raise to securing institutional and external resources, this panel will discuss how faculty find and ask for resources needed for teaching, research, and other creative endeavors. What are appropriate requests and how can you effectively make them to help further your own career as well as the profession? Sponsored by the Project NEXt Peach dots.

Organizers:

- Zsuzsanna Szaniszló**, *Valparaiso University*
- Leigh M. Lunsford**, *Longwood University*

Panelists:

- Martha Abell**, *Georgia Southern University*
- Linda Braddy**, *Tarrant County College*
- Richard Cleary**, *Babson College*

Sponsor: Project NEXt Peach dots

POSTER SESSION

MAA General Contributed Poster Session

1:30 P.M. - 3:00 P.M., PLAZA EXHIBIT HALL, PLAZA BUILDING

The MAA is pleased to announce the inaugural General Contributed Poster Session (GCPS) at MathFest 2018 in Denver. We will rotate the poster categories throughout the meeting and the number of rotations will depend on the number of accepted posters. The MAA will provide corkboards for the posters – you just need to bring your poster.

1. A Tale of Links between Arithmetic and Poset's Möbius Functions

- Emil D. Schwab**, *The University of Texas at El Paso*
- Gabriela Schwab**, *El Paso Community College*

CHRONOLOGICAL SCHEDULE

Thursday, August 2 CONTINUED

2. Annihilator Ideal Based Zero Divisor Graph of Z Modulo N over Z , Complemented Condition and Girth

Irawati Irawati, *Bandung Institute of Technology*
Farhani Farhani, *Bandung Institute of Technology*

3. Computer-Assisted Calculation in Hopf Algebra Representations

John E. Foster, *Walla Walla University*

4. Some Relations on Prefix Reversal Generators of the Symmetric and Hyperoctahedral Group

Charles Buehrle, *Notre Dame of Maryland University*
Saul Blanco, *Indiana University*

5. A Practical Parallelizable Fourth-Order Modification of Laguerre's Method

Thomas Cameron, *Davidson College*

6. Comparisons of Locally Determined Nonlinear Maps and Generalized Orthomorphisms

William Feldman, *University of Arkansas*

7. Convergence Speed of Some Random Implicit-Kirk-Type Iterations for Contractive-type Random Operators

Hudson Akewe, *University of Lagos*

8. Do Annular Functions Abound?

Russell W. Howell, *Westmont College*

10. Generalizations of the Enestrom-Kakeya Theorem

Aaron Melman, *Santa Clara University*

11. Vector Reconstruction: A Generalized Kaczmarz Algorithm

Anna Seitz, *Iowa State University*
Mary Vaughan, *Iowa State University*
Nate Harding, *Iowa State University*
Emelie Curl, *Iowa State University*

12. An AMG Approach in Solving Graph Laplacians of Protein Networks Based on Diffusion State Distance Metrics

Junyuan Lin, *Tufts University*

13. A Cost Benefit Analysis of Cyber Defense Improvements

Tung Thai, *Wentworth Institute of Technology*

14. Reduced Fertility and Asymptotics of the Logistic Model

Laurentiu Segă, *Augusta University*

15. Clique Immersion in Graph Products

Megan E. Heenehan, *Eastern Connecticut State University*
Karen L. Collins, *Wesleyan University*
Jessica McDonald, *Auburn University*

16. Iterated Line Graphs of Trees and Bi-Regular Graphs

Liz Lane-Harvard, *University of Central Oklahoma*

17. Limit Characterizations through Spanning Trees in Multigraphs: An Exploration

Joshua Steier, *Seton Hall University*
Kristi Luttrell, *Seton Hall University*
John T. Saccoman, *Seton Hall University*

18. Minimal Embedding Dimensions of Rectangle k -Visibility Graphs

Espen Slettnes, *University of California, Berkeley*

19. Radio Number for Ninth Power Paths

Joel Salazar, *California State University, San Bernardino*

20. The Saturation Number of Single-Defect Carbon Nanocones

Taylor Short, *Grand Valley State University*

21. Using Graph Theory to Design Optimal Strategies for DNA Self-Assembly

Hector Dondiego, *Lewis University*
Chandler Stimpert, *Lewis University*

22. Enumerating Multiple Frog Paths

Matthew Hudelson, *Washington State University*

23. A Brief on Direct Product Models and Languages

Cyrus F. Nourani, *Acadmkrd AI Berlin*

24. Matrix Powers and Symmetric Polynomials

Joshua Boone, *Lincoln Memorial University*

25. Upper Bounds for the Bond Percolation Thresholds of the Cubic, Body-Centered Cubic, and Face-Centered Cubic Lattices by a Growth Process Approach

John C. Wierman, *Johns Hopkins University*

26. Effect of Solar Variability on North Atlantic Climate

Jessica Oehrlein, *Columbia University*
Gabriel Chiodo, *Columbia University*
Lorenzo M. Polvani, *Columbia University*
John Fyfe, *Environment Canada*
Anne K. Smith, *National Center for Atmospheric Research*

27. Fibonacci Identities: No Induction Required

Ethan Berkove, *Lafayette College*
Michael Brilleslyper, *U. S. Air Force Academy*

CHRONOLOGICAL SCHEDULE CONTINUED

Thursday, August 2 CONTINUED

28. Generalized Zeckendorf Expansions

David Terr, *UC Berkeley*

29. Primes and Divisibility Patterns in the Repdigit Sequence 3, 31, 311, 3111, 31111,...

Kryssa C. Goodhart, *Rowan University*
Jay L. Schiffman, *Rowan University*

30. Recent Developments on Stern's Diatomic Sequence and a Sister Function

Aubrey R. Laskowski, *University of Illinois at Urbana-Champaign*
Michael J. Schirle, *University of Illinois at Urbana-Champaign*

31. Solutions to the Diophantine Equation $X+Y=CZ^2$ when XY Is Divisible by a Fixed Set of Two Primes

Robert Styer, *Villanova University*
Reese Scott, *Somerville, MA*

32. The Modeling and Calculation of Rise and Fall of the Liquid in Capillary Action by Poisson

Shigeru Masuda, *RIMS, Kyoto University*

WORKSHOP

What's the Story? Research Presentations for an Undergraduate Audience

1:30 P.M. - 2:50 P.M., TOWER COURT D, TOWER BUILDING

Presenting research to undergraduate students is rewarding, but challenging. The gory details of mathematical results often require specific jargon and background knowledge. Nonetheless, the big idea—the “story”—can almost always be presented at a variety of levels. This workshop is designed to help graduate students formulate a presentation on their research that is appropriate for an audience of undergraduate students.

Organizer:

May Mei, *Denison University*

Sponsor: *Committee on Graduate Students*

MINICOURSE

Minicourse 1. Initiating, Designing, Building, and Using Modeling Scenarios for Teaching Differential Equations, Part A

1:30 P.M. - 3:30 P.M., TOWER COURT A, TOWER BUILDING

We offer guidance and resources for developing materials for teaching differential equations using models. We discuss how to produce modeling scenarios and help participants focus on projects of their own. Sharing resources will assist participants in shaping their own modeling scenarios. Through active, hands-on, group work participating faculty will experience using modeling to teach differential equations from day one.

Brian Winkel, *SIMIODE*

Eric Sullivan, *Carroll College*

Lisa Driskell, *Colorado Mesa University*

Audrey Malagon, *Virginia Wesleyan University*

Sponsor: *Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations (SIMIODE)*

MINICOURSE

Minicourse 6. Visualizing Projective Geometry Through Photographs and Perspective Drawings, Part A

1:30 P.M. - 3:30 P.M., TOWER COURT B, TOWER BUILDING

We introduce hands-on, practical art puzzles that motivate the mathematics of projective geometry—the study of properties invariant under projective transformations. On the art side, we explore activities in perspective drawing or photography. These activities inform the mathematical side, where we introduce activities in problem solving and proof suitable for a sophomore-level proofs class. No artistic experience is required.

Annalisa Crannell, *Franklin & Marshall College*

Fumiko Futamura, *Southwestern University*

UNDERGRADUATE STUDENT PAPER SESSION

MAA Student Paper Sessions

2:30 P.M. - 6:05 P.M., PLAZA COURTS 1-4, PLAZA BUILDING

Organizers:

Eric Ruggieri, *College of the Holy Cross*

Chasen Smith, *Georgia Southern University*

UNDERGRADUATE STUDENT PAPER SESSION

Pi Mu Epsilon Student Paper Sessions

2:30 P.M. - 6:25 P.M., PLAZA COURTS 5-8, PLAZA BUILDING

Organizer:

Darci Kracht, *Kent State University*

CHRONOLOGICAL SCHEDULE

Thursday, August 2 CONTINUED

TOWN HALL SESSION

Mathematical Mamas – Being Both Beautifully

3:00 P.M. – 4:20 P.M., PLAZA BALLROOM F, PLAZA BUILDING

Women have always been involved in mathematics and science. Even though we are past the days when women had to deny their self-identity to pursue mathematics, we still have work to do. With more mothers (and fathers) bridging the gap between academia and parenthood, this town hall will celebrate victories and discuss solutions to challenges that arise from this intersection.

Organizers:

Jacqueline Jensen-Vallin, *Lamar University*
Emille Davie Lawrence, *University of San Francisco*
Erin Militzer, *Ferris State University*

OTHER MATHEMATICAL SESSION

Section Officers Meeting

3:00 P.M. - 5:00 P.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

This session is moderated by Lisa Marano, West Chester University, Chair of the MAA Committee on Sections. It is open to all section officers and their guests.

SESSION FOR GRADUATE STUDENTS

Speed Interviewing Marathon for Students

3:00 P.M. – 4:20 P.M., TOWER COURT D, TOWER BUILDING

Employers suggest communication skills are a critical component of job interviews. This session for undergraduate students, graduate students and early career mathematicians helps participants hone these skills, with best practices and tips on job interviewing and three speed interviewing sessions to practice what participants have learned. Sessions include individual feedback for participants and opportunities to network with fellow interviewees.

Organizers:

Jenna Carpenter, *Campbell University*
Edray Goins, *Purdue University*

Sponsor: MAA Committee on Graduate Students

INVITED PAPER SESSION

The MAA Instructional Practices Guide in Action

3:00 P.M. - 5:30 P.M., PLAZA BALLROOM E, PLAZA BUILDING

The goal of the session is to bring the new MAA Instructional Practices (IP) Guide to life for the mathematical community. Talks will demonstrate how members of the community are using the IP Guide in their classroom practice or for professional development.

Organizers:

Martha Abell, *Georgia Southern University*
Carolyn Yackel, *Mercer University*

Professional Development for Collegiate Instructors with the MAA Instructional Practices Guide

3:30 P.M. - 3:20 P.M.

Hortensia Soto, *University of Northern Colorado*

Graduate Teaching Assistant Development via the MAA Instructional Practices Guide

3:30 P.M. - 3:50 P.M.

Gulden Karakok, *University of Northern Colorado*

Developing Persistence in Problem Solving in relation to the MAA Instructional Practices Guide

4:00 P.M. - 4:20 P.M.

Angie Hodge, *Northern Arizona University*

Paired Board Work is Definitely Not Bored Work

4:30 P.M. - 4:50 P.M.

April D. Strom, *Scottsdale Community College*

Five Essential Elements for Cooperative Learning described in the MAA Instructional Practices Guide

5:00 P.M. - 5:20 P.M.

James A. Mendoza Álvarez, *The University of Texas at Arlington*

POSTER SESSION

MAA General Contributed Poster Session

3:30 P.M. - 5:00 P.M., PLAZA EXHIBIT HALL, PLAZA BUILDING

The MAA is pleased to announce the inaugural General Contributed Poster Session (GCPS) at MathFest 2018 in Denver. We will rotate the poster categories throughout the meeting and the number of rotations will depend on the number of accepted posters. The MAA will provide corkboards for the posters – you just need to bring your poster.

2. Standards Based Assessment: An Easy-to-Use SBA Quiz System

James Olsen, *Western Illinois University*

CHRONOLOGICAL SCHEDULE CONTINUED

 Thursday, August 2 CONTINUED
3. Mathematics Learning Support at US Colleges & Universities

David Thomas, *University of Providence*

Ciaran Mac an Bhaird, *Maynooth University, Ireland*

4. A Comparison of Two Approaches to Teaching Calculus I

Jonathan Hulgan, *Oxford College of Emory University*

5. The “Lost” Books of Euclid’s Elements

Chuck Lindsey, *Florida Gulf Coast University*

6. A College Geometry Course Involving Civilization, Logic and Beauty

Wen-Haw Chen, *Tunghai University*

7. Opening Up the Transitions Course: New Proof Tasks for the Creative Math Major

Jamie Sutherland, *University of Delaware*

8. Calculus in Virtual Reality

Nicholas Long, *Stephen F. Austin State University*

Jeremy Becnel, *Stephen F. Austin State University*

9. Application Projects to Students in Calculus for Life Science

Yanping Ma, *Loyola Marymount University*

10. Blending Team-based Learning with Standards-Based Grading in a Calculus I classroom

Jeffrey M. Ford, *Gustavus Adolphus College*

11. Developing Tightly Coordinated Calculus Courses for STEM Majors

James M. Talamo, *The Ohio State University*

12. Student Perceptions of Engagement in Calculus 1

Kristen Mazur, *Elon University*

Laura Taylor, *Elon University*

13. Using History to Motivate Calculus

Dan Kemp, *South Dakota State University*

14. Whose Math and For What Purpose? A Community Seminar on Identity, Culture, and Mathematics,

Gizem Karaali, *Pomona College*

15. Case Study of Student Success

Kyle Riley, *South Dakota School of Mines & Technology*

16. Beyond the Textbook - Stories, Cartoons, and More

Janet St.Clair, *Alabama State University*

17. Choreographing in Problem Solving: Mathematical Interpretations of Figure Skaters’ Blade Tracings

Rachael Talbert, *Towson University*

Diana Cheng, *Towson University*

18. Math Races and Jeopardy Games

David DiMarco, *Neumann University*

Ryan Savitz, *Neumann University*

19. Transforming Instruction in Undergraduate Mathematics via Primary Historical Sources

Nicholas Scoville, *Ursinus College*

Dominic Klyve, *Central Washington University*

Jerry Lodder, *New Mexico State University*

Janet Barnett, *Colorado State University–Pueblo*

Danny Otero, *Xavier University*

Kathy Clark, *Florida State University*

Diana White, *University of Colorado Denver*

20. Using Investigation Activities to Incorporate Inquiry Based Learning Principles in the Classroom

Gabriella Harris, *Towson University*

Kimberly Corum, *Towson University*

21. Classroom Stats: Spice Up Your Classroom with Fun, Live, Data Collection and Analysis

David G. Taylor, *Roanoke College*

Adam F. Childers, *Roanoke College*

22. Creating a Learning Map for Introductory Statistics

Heidi Hulsizer, *Benedictine College*

Megan Lutz, *University of Georgia*

Dione Maxwell, *Loganville High School, Loganville GA*

Jonathan Templin, *University of Kansas*

Laura Zielger, *Iowa State*

23. Culling Engaging Statistical Activities From the Wild: R as an Aid to Reading the News

Meredith Anderson, *Adams State University*

24. Data Science for Math Majors

William C. Calhoun, *Bloomsburg University*

25. Teaching Data-Centric Statistics: StatPREP at the end of Year 1

Jenna Carpenter, *Campbell University*

Michael Brilleslyper, *U. S. Air Force Academy*

Kathryn Kozak, *Coconino Community College*

26. Outcomes and Issues from an NSF SSTEM Grant: Recruiting, Research, and Curriculum Evolution

James Quinlan, *University of New England*

Amy Deveau, *University of New England*

CHRONOLOGICAL SCHEDULE

Thursday, August 2 CONTINUED

28. Flipping Finite

Emma Wright, *Plymouth State University*

29. Polishing a Flip

Mel Henriksen, *Wentworth Institute of Technology*

30. Implementing Inquiry Using POGIL

Jill Shahverdian, *Quinnipiac University*

31. Teaching Mathematics to Future Teachers: A New Layer to the Content

Nermin Bayazit, *Fitchburg State University*

32. Use of a Popular Logo, the Five-Cornered Star (aka Regular Pentagon) in Teaching Different Levels of Mathematics

Danny T. Lau, *University of North Georgia*

33. Students' Mathematical Modeling of One-Point Perspective Paintings

Rachel Schmitz, *Towson University*

Kristin Frank, *Towson University*

34. How (NOT) to Make Discovery-Learning Assessments

Kayla Blyman, *United States Military Academy - West Point*

Lisa Bromberg, *United States Military Academy - West Point*

Kristin Arney, *United States Military Academy - West Point*

35. Investigating Properties of Magic Matrices

Alexis Wilding, *Weber State University*

MINICOURSE

Minicourse 2. Introduction to Inquiry-Based Learning, Part A

4:00 P.M. – 6:00 P.M., TOWER COURT A, TOWER BUILDING

This minicourse will be a hands-on introduction to inquiry-based learning, a pedagogical approach that strongly emphasizes active learning and sense-making. Facilitators and participants will model IBL classroom modes as teachers and students and analyze on these experiences so that participants can integrate these modes into their teaching practice. The minicourse is intended for instructors new to inquiry-based learning.

Brian P Katz, *Augustana College*

Victor Piercey, *Ferris State University*

Eric Kahn, *Bloomsburg University*

Candice Price, *University of San Diego*

Xiao Xiao, *Utica College*

Alison Marr, *Southwestern University*

Sponsor: *The SIGMAA for Inquiry-Based Learning (IBL SIGMAA)*

MINICOURSE

Minicourse 5. Mathematical Card Magic, Part A

4:00 P.M. – 6:00 P.M., TOWER COURT B, TOWER BUILDING

A survey of modern self-working mathematical card magic, including original principles and effects shared online in the Card Colm blog (2004-2014) at MAA.org. A special feature will be two-person card magic based on subtle mathematical communication principles. The material can be used to liven up mathematics classes and motivate student learning. The only prerequisite is curiosity.

Colm Mulcahy, *Spelman College*

PANEL SESSION

How to Apply for Jobs in Academia and Industry after Your PhD

4:30 P.M. – 5:50 P.M., PLAZA BALLROOM F, PLAZA BUILDING

This session is aimed at graduate students and recent PhDs. An overview of the employment process will be given with ample opportunity for participants to ask questions. Questions that will be addressed include: How do you find which jobs are available? How do you choose which jobs you want to apply for? What are academic and other employers looking for in the materials that you send? How should you tailor your application materials for the job that you are applying for? How do schools conduct interviews?

Organizers:

Edray Goins, *Purdue University*

Eric Eager, *University of Wisconsin at La Crosse*

Panelists:

James Curry, *University of Colorado at Boulder*

Katy Nowak, *Pacific Northwest National Lab*

Joanne Peoples, *El Paso Community College*

John Rock, *Cal Poly Pomona*

Sponsors: *The MAA Committee on Graduate Students and the MAA Committee on Early Career Mathematicians.*

WORKSHOP

An Introduction to Team-Based Learning

4:30 P.M. - 5:50 P.M., TOWER COURT D, TOWER BUILDING

This workshop will introduce participants to Team-Based Learning (TBL), a highly structured form of collaborative learning that integrates aspects of flipped learning, problem-based learning, and inquiry-based learning. In this workshop, participants will see TBL in action and learn how to use TBL to create a vibrant, active classroom. Participants are encouraged to complete a short pre-reading at <http://clontz.org/mathfest/before attending>.

CHRONOLOGICAL SCHEDULE CONTINUED

Thursday, August 2 CONTINUED

Organizers:

Drew Lewis and Steven Clontz, *University of South Alabama*

SOCIAL EVENT

Estimathon!

4:30 P.M. – 6:15 P.M., GRAND BALLROOM II, TOWER BUILDING

Jane Street Capital presents: The Estimathon!

Work in teams to compete in a fun, fast-paced game that melds math and trivia. There'll be prizes for the winning teams. Open to everyone: undergrads, profs, high school students, etc. (Note that there are two sessions. Feel free to attend either one!)

Organizer:

Andy Niedermaier, *Jane Street Capital*

SIGMAA ACTIVITY

SIGMAA MCST Business Meeting

5:30 P.M. – 6:20 P.M., GOVERNOR'S SQUARE 16, PLAZA BUILDING

SESSION FOR GRADUATE STUDENTS

Graduate Student Reception

6:00 P.M. – 7:00 P.M., WINDOWS ROOM, TOWER BUILDING

Graduate students are invited for some refreshments and to meet several of the invited speakers.

Organizers:

Edray Goins, *Purdue University*

Eric Eager, *University of Wisconsin at La Crosse*

SIGMAA ACTIVITY

SIGMAA QL Business Meeting

6:00 P.M. - 7:00 P.M., GOVERNOR'S SQUARE 16, PLAZA BUILDING

OTHER MATHEMATICAL SESSION

The President's Membership Jubilee

7:00 P.M. - 8:30 P.M., GRAND BALLROOM I, TOWER BUILDING

An evening of musical performances by members celebrating members of the Mathematical Association of America. This event is free and open to all MAA MathFest attendees. All MAA members, new and those celebrating their 25th and 50th anniversaries are encouraged to attend.

Friday, August 3

Registration

8:00 A.M. - 6:00 P.M., PLAZA REGISTRATION, PLAZA BUILDING

UNDERGRADUATE STUDENT PAPER SESSION

MAA Student Paper Sessions

9:30 A.M. – 12:05 P.M., PLAZA COURTS 1-4, PLAZA BUILDING

Organizers:

Eric Ruggieri, *College of the Holy Cross*

Chasen Smith, *Georgia Southern University*

UNDERGRADUATE STUDENT PAPER SESSION

Pi Mu Epsilon Student Paper Sessions

9:30 A.M. – 12:25 P.M., PLAZA COURTS 5-8, PLAZA BUILDING

Organizer:

Darci Kracht, *Kent State University*

OTHER MATHEMATICAL SESSION

MAA Prize Session

8:30 A.M. – 9:10 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

This session is organized by James Sellers, Pennsylvania State University, MAA Secretary, and is moderated by Deanna Haunsperger, Carleton College, MAA President.

Exhibit Hall

9:00 A.M. - 5:00 P.M., PLAZA EXHIBIT HALL, PLAZA BUILDING

CONTRIBUTED PAPER SESSION

A Number is Never an Answer: Developing Mathematical Thinking and Communication Through Writing, Part B

9:00 A.M. - 12:15 P.M., GOVERNOR'S SQUARE 10, PLAZA BUILDING

Organizers:

William Gryc and Linda McGuire, *Muhlenberg College*

Reflective and Expository Mathematical Writing Assignments

9:00 A.M. - 9:15 A.M.

Lauren DeDieu, *University of Calgary*

Math ≠ Writing?

9:20 A.M. - 9:35 A.M.

Zoe Dai, *Alma College*

CHRONOLOGICAL SCHEDULE

Friday, August 3 CONTINUED

Journaling in Trigonometry

9:40 A.M. - 9:55 A.M.

Livvia L. Bechtold, *University of Colorado Denver*

Using Writing to Aid Pre-Service Teachers' Understanding and Explanations of Mathematical Concepts

10:00 A.M. - 10:15 A.M.

Kelleen Bonomo, *Grove City College*

Case Studies in Statistics for Business Students

10:20 A.M. - 10:35 A.M.

Ranjan Rohatgi, *Saint Mary's College*

Kristin Kuter, *Saint Mary's College*

Charles Peltier, *Saint Mary's College*

Writing in Statistics Class

10:40 A.M. - 10:55 A.M.

Lanee Young, *Fort Hays State University*

Math Without Writing: Like a Car Without Wheels

11:00 A.M. - 11:15 A.M.

Magdalena Luca, *Massachusetts College of Pharmacy & Health Sciences*

Two Introductory Mathematical Writing Assignments

11:20 A.M. - 11:35 A.M.

Alexander Halperin, *Salisbury University*

Colton Magnant, *Georgia Southern University*

"Dear Calculus Consultant": Projects Where Students Act as Experts

11:40 A.M. - 11:55 A.M.

Haley A. Yaple, *Carthage College*

Writing on Calculus Exams: Forcing Students to Reason and Communicate

12:00 P.M. - 12:15 P.M.

Andrew George, *Penn State Erie*

INVITED ADDRESS

AWM-MAA Etta Zuber Falconer Lecture

Finding Ellipses

9:30 A.M. - 10:20 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Pamela Gorkin, *Bucknell University*

Ellipses make frequent appearances in our lives: Kepler's laws of planetary motion involve ellipses and a medical procedure involving kidney stones known as lithotripsy uses them as well. We see ellipses in architecture and in President's Park South we find a park called simply "The Ellipse." What properties of the ellipse make it so important? How can we construct an ellipse? We begin with questions like these, providing some unfamiliar answers. Then we study three seemingly unrelated problems in mathematics, chosen from linear algebra, complex analysis, and projective geometry, and we show how the solution to each of these problems relies on finding ellipses.

CONTRIBUTED PAPER SESSION

Inquiry-Based Learning and Teaching, Part A

9:30 A.M. - 12:25 P.M., GOVERNOR'S SQUARE 14, PLAZA BUILDING

Inquiry-Based Learning approaches seek to transform students from consumers to producers of mathematics. Inquiry-based methods aim to help students develop a deep understanding of mathematical concepts and the processes of doing mathematics by putting those students in direct contact with mathematical phenomena, questions, and communities. This session invites scholarly presentations on the use of inquiry-based methods for teaching and learning.

Organizers:

Brian Katz, *Augustana College*

Eric Kahn, *Bloomsburg University*

Victor Piercey, *Ferris State University*

Candice Price, *University of San Diego*

Xiao Xiao, *Utica College*

Amanda H. Matson, *Clarke University*

Mindy Capaldi, *Valparaiso University*

Kayla Dwelle, *Ouachita Baptist University*

Phong Le, *Goucher College*

Transitioning from Lecture to IBL

9:30 A.M. - 9:45 A.M.

Jessica Williams, *Converse College*

Successes (and Failures) from a First Attempt at Inquiry

9:50 A.M. - 10:05 A.M.

Kristen Pueschel, *Penn State New Kensington*

CHRONOLOGICAL SCHEDULE CONTINUED

Friday, August 3 CONTINUED

IBL in Linear Algebra: Same Theory, More Practice
 10:10 A.M. - 10:25 A.M.
 Robin Cruz, *The College of Idaho*

Productive Failure of an IBL Proofs Course
 10:30 A.M. - 10:45 A.M.
 Jeb Collins, *University of Mary Washington*

Promoting Inquiry with Recreational Problems in a Liberal Arts Math Course
 10:50 A.M. - 11:05 A.M.
 Mike Janssen, *Dordt College*

Using IBL: Daily Group Work in Calculus Classes
 11:10 A.M. - 11:25 A.M.
 Violeta Vasilevska, *Utah Valley University*

Comparing Inquiry-Based Learning to Parenting
 11:30 A.M. - 11:45 A.M.
 Aliza Steurer, *Dominican University*

Tips and Tricks for Tracking a Student Centered Class
 11:50 A.M. - 12:05 P.M.
 Mariah Birgen, *Wartburg College*

Specifications Grading in an IBL Classroom
 12:10 P.M. - 12:25 P.M.
 Anne Sinko, *College of St. Benedict/St. John's University*

CONTRIBUTED PAPER SESSION

Priming the Calculus Pump: Fresh Approaches to Teaching First-Year Calculus, Part A

9:30 A.M. - 12:25 P.M., GOVERNOR'S SQUARE 16, PLAZA BUILDING

Many first-year college calculus students have had a previous encounter with calculus in high school. These new college calculus students start calculus having seen much of the material, but with a weakness or a lack of confidence in some areas. This audience creates unique challenges to the instructor. This session seeks to share fresh approaches to engage this audience.

Organizers:

Chuck Garner, *Rockdale Magnet School for Science and Technology*
Bob Sachs, *George Mason University*

Sponsor: *The SIGMAA on Teaching Advanced High School Mathematics (SIGMAA TAHSM)*

Re-envisioning the Calculus Sequence
 9:30 A.M. - 9:45 A.M.
 Alex M. McAllister, *Centre College*
 Joel Kilty, *Centre College*
 Alison Marr, *Southwestern University*

An Integrated Interactive Approach to the Calculus Sequence
 9:50 A.M. - 10:05 A.M.
 Joseph Spivey, *Wofford College*
 Matthew Cathey, *Wofford College*

Calculus in Context: An Innovative Approach to Calculus
 10:10 A.M. - 10:25 A.M.
 Sarah Hews, *Hampshire College*

Calculus for Students Who Already "Know" Calculus
 10:30 A.M. - 10:45 A.M.
 William T. Mahavier, *Lamar University*

Calculus in the Real World: Increasing Relevancy Through Data and Modeling
 10:50 A.M. - 11:05 A.M.
 Rachel Grotheer, *Goucher College*

Implementing Preclass Readings in Calculus
 11:10 A.M. - 11:25 A.M.
 Salam Turki, *Rhode Island College*
 Houssein El Turkey, *University of New Haven*
 Yasanthi Kottegoda, *University of New Haven*

Boot Camp for Freshmen Calculus I Students
 11:30 A.M. - 11:45 A.M.
 Peter Olszewski, *Penn State Behrend*

Strategies that Support Students Meeting the Demands of a First-Year Calculus Course
 11:50 A.M. - 12:05 P.M.
 Aaron Trocki, *Elon University*
 Karen Yokley, *Elon University*
 Jan Mays, *Elon University*
 James Beuerle, *Elon University*

Moving Calculus from the Classroom to the Boardroom
 12:10 P.M. - 12:25 P.M.
 Della Dumbaugh, *University of Richmond*

CHRONOLOGICAL SCHEDULE

Friday, August 3 CONTINUED

INVITED ADDRESS

Earle Raymond Hedrick Lecture Series

Nonlinear Dispersive Equations and the Beautiful Mathematics That Comes with Them, Lecture II

10:30 A.M. - 11:20 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Gigliola Staffilani, *Massachusetts Institute of Technology*

In these lectures I will give an overview of the rich mathematical structures that characterize the wave solutions of some of the most important nonlinear partial differential equations, such as the Schrödinger equation. In doing so I will illustrate how beautiful pieces of mathematics, developed using different tools, not just coming from analysis, have been generated over the years in order to answer some of the most fundamental questions for these equations, such as existence and uniqueness of solutions for example. Along the way I will formulate open questions and possible new directions of investigation.

CONTRIBUTED PAPER SESSION

Recreational Mathematics: Puzzles, Card Tricks, Games, Gambling and Sports, Part A

10:30 A.M. - 12:25 P.M., GRAND BALLROOM II, TOWER BUILDING

Puzzles, card tricks, board games, game shows, gambling, and sports provide an excellent laboratory for testing mathematical strategy, probability, and enumeration. The analysis of such diversions is fertile ground for the application of mathematical and statistical theory. Solutions to new problems as well as novel solutions to old problems are welcome.

Organizers:

Paul R. Coe, *Dominican University*

Sara B. Quinn, *Dominican University*

Kristen Schemmerhorn, *Concordia University Chicago*

Andrew Niedermaier, *Jane Street Capital*

Using Advanced Accuracy Data and Machine Learning to Model Quality of Play at the Quarterback Position

10:30 A.M. - 10:45 A.M.

Eric Eager, *University of Wisconsin - La Crosse*

George Chahroui, *Pro Football Focus*

Building a Numerical Baseball Simulator

10:50 A.M. - 11:05 A.M.

Paul von Dohlen, *William Paterson University*

Tournament Scheduling Improvements

11:10 A.M. - 11:25 A.M.

Jeff Poet, *Missouri Western State University*

Fantasy on a Baseball Theme

11:30 A.M. - 11:45 A.M.

Thomas Q. Sibley, *St. John's University*

Would Wheel of Fortune be Easier in Dothraki or Klingon?

11:50 A.M. - 12:05 P.M.

Benjamin Wilson, *Stevenson University*

Beyond the "Monty Hall Problem": The Mathematics of Let's Make a Deal

12:10 P.M. - 12:25 P.M.

Anthony DeLegge, *Benedictine University*

INVITED ADDRESS

MAA Invited Address

Inclusion-exclusion in Mathematics: Who Stays in, Who Falls out, Why It Happens, and What We Should Do About It

11:30 A.M. - 12:20 P.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Eugenia Cheng, *School of the Art Institute of Chicago*

The question of why women are under-represented in mathematics is complex and there are no simple answers, only many contributing factors. I will focus on character traits, and argue that if we focus on this rather than gender we can have a more productive and less divisive conversation. To try and focus on characters rather than genders I will introduce gender-neutral character adjectives "ingressive" and "congressive" to replace masculine and feminine. I will share my experience of teaching congressive abstract mathematics to art students, in a congressive way, and the possible effects this could have for everyone in mathematics, not just women. I will present the field of Category Theory as a particularly congressive subject area, accessible to bright high school students, and contrast it with the types of math that are often used to push or stimulate those students. No prior knowledge will be needed.

INVITED ADDRESS

NAM David Harold Blackwell Lecture

Continuous, Discrete, or Somewhere in Between: An Introduction to Time Scales with Applications

1:30 P.M. - 2:20 P.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Raegen Higgins, *Texas Tech University*

Since Stefan Hilger's landmark paper in 1988, progress has been made in the unification and extension of discrete and continuous analysis. The broad idea is to prove a result once for a dynamic equation where the domain of the unknown function is a time scale \mathbb{T} , which is an arbitrary, nonempty, closed subset of the real numbers.

In this talk, we will use the exponential function e^{at} to introduce the theory of time scales. Considering a certain second-order linear delay dynamic equation, we establish some sufficient conditions

CHRONOLOGICAL SCHEDULE CONTINUED

Friday, August 3 CONTINUED

which ensure that every solution oscillates. The obtained results unify the oscillation of second-order delay differential and difference equations.

Our interest in delay equations has led us to study a certain area of mathematical physiology. We are using mathematical models to understand how behavioral disruption of the circadian clock can lead to glucose dysregulation. In this talk, we present some preliminary results.

POSTER SESSION

MAA General Contributed Poster Session III

1:00 P.M. - 2:30 P.M., PLAZA EXHIBIT HALL, PLAZA BUILDING

The MAA is pleased to announce the inaugural General Contributed Poster Session (GCPS) at MathFest 2018 in Denver. We will rotate the poster categories throughout the meeting and the number of rotations will depend on the number of accepted posters. The MAA will provide corkboards for the posters – you just need to bring your poster.

1. **A Better Path to Math Careers**
Tim McEldowney, *University of California, Riverside*
2. **Girls <3 “Hands On Mathematics”**
Victoria Kofman, *Stella Academy*
3. **Partnerships Within and Without: Expanding the Reach of the Mathematical Sciences at the University of the Virgin Islands**
Camille McKayle, *University of the Virgin Islands*
Robert Stolz, *University of the Virgin Islands*
Nadia Monroe, *University of the Virgin Islands*
4. **Use Interinstitutional Collaboration and Cyberlearning to Offer Computational Science Courses for a Computational Math Degree Program in a Small University**
Hong P. Liu, *Embry-Riddle Aeronautical University*
5. **Beautiful Integer Patterns, Version 4.0: Variations on a Binomial Theme**
Charlie Smith, *Park University*
6. **A Machine Learning Approach to Designing Guidelines for Acute Aquatic Toxicity**
Barry C. Husowitz, *Wentworth Institute of Technology*
7. **Discussing Mathematical Microaggressions with Pre-Service K-8 Teachers**
Zachary Beamer, *University of Virginia*
8. **Letting Teachers Notice and Wonder**
Derek J. Sturgill, *University of Wisconsin: Stout*
9. **Relationship between Students Van Hiele Levels and the Geometric Content**
John F. Ekpe, *Accra Technical University*
10. **Thinking Outside the Plane: Teaching Non-Euclidean Geometries at Pre-College Levels**
J. Mealy, *Austin College*
Tyler Shaw, *Austin College*
11. **Reducing Student Testing Anxiety by Implementing a Three-Stage Group Testing Method**
Suzanne Caulfield, *Cardinal Stritch University*
12. **The Initial Development of ICAP4Calc: An Inventory of Algebra Concepts**
Bradley J. Paynter, *University of Central Oklahoma*
Elizabeth Lane-Harvard, *University of Central Oklahoma*
13. **Using History to Integrate a Faith-Based Mission into the Mathematics Classroom**
Caira B. Bongers, *Bryn Athyn College*
14. **What Should We Teach in Mathematics as Artificial Intelligence Becomes Increasingly Powerful?**
Alexander G. Atwood, *Suffolk County Community College*
15. **Views on an Open Technology Policy in Mathematics Classrooms**
James R. Valles, Jr., *Prairie View A&M University*
16. **Providing Mathematics Students a Transformative Learning Experience Beyond the Classroom**
Kristi Karber, *University of Central Oklahoma*
17. **Establishing Practices Integrating Commuter Students - Year 1**
Mindy B. Capaldi, *Valparaiso University*
18. **Establishing a Connection Between Julia Sets and Julia Quadratics**
Sukanya Basu, *University of Toledo*
19. **Logarithmic Patterns in Classical Music**
Azar Khosravani, *Columbia College Chicago*
20. **Number Talks: A Vehicle for Understanding**
Jennifer Bergner, *Salisbury University*
21. **Sequences with the Zeckendorf Property**
Curtis Herink, *Mercer University*
22. **Surviving the Apocalypse with a Compass and a Straight Edge**
Grace E. Cook, *Bloomfield College*

CHRONOLOGICAL SCHEDULE

Friday, August 3 CONTINUED

23. Colorado State University - Pueblo - 40 years and Counting

Janet Nichols, Colorado State University - Pueblo

24. Summer Illinois Math Camp

Claire Merriman, University of Illinois at Urbana-Champaign

Emily Heath, University of Illinois at Urbana-Champaign

Simone Sisneros-Thiry, University of Illinois at Urbana-Champaign

Jenna Zomback, University of Illinois at Urbana-Champaign

25. Taking Math to the Streets

Axel Brandt, Northern Kentucky University

Tanya Chartier, The Davidson Center

Tim Chartier, Davidson College

26. The 2018 SUMMA Math Teachers' Circle Workshop

David R. Scott, Univ. of Puget Sound

27. A Student's Declassified Grad School Survival Guide,

Lisa J. Mueller, University of Kentucky

28. L(2,1)-Labeling OF Circulant Graphs

Soumya Bhoumik, Fort Hays State University

Sarbari Mitra, Fort Hays State University

29. A Missing Entry in Sullivan's Dictionary?

Colby Kelln, University of Michigan

Sean Kelly, University of Michigan

Justin Lee, University of Michigan

30. Teach-Touch (Economics)

Galit Eizman, Harvard University

31. Student Assumptions about An Introductory Course in Business Statistics and Their Impact on Learning Outcomes

Deborah J. Gougeon, University of Scranton

32. Motiving Students through Extra-Curricular Activities

Ge Mu, Penn State New Kensington

33. An Invitation to Study Mathematics: The First-year Seminar Course at Colorado Mesa University

Tracii Friedman, Colorado Mesa University

34. Measuring Income Inequality in a General Education or Calculus Mathematics Classroom

Barbara O'Donovan, Saint Michael's College

35. Use of Multimedia Technology for Effective Teaching and Learning of Plane Geometry at the Middle Basic School Level in Nigeria

Solomon A. Iyekekpolor, Taraba State University

Oyeniyi Solomon Olayinka, Taraba State University

INVITED PAPER SESSION

Modeling Biological Rhythms

1:30 P.M. - 5:00 P.M., PLAZA BALLROOM E, PLAZA BUILDING

Periodic oscillations are a characteristic feature of many living systems. Cells, organs, and whole organisms often exhibit regular clock-like behavior. Examples include circadian rhythms, heartbeats, brain waves, and the synchronization of behaviors across populations. Researchers seek to understand how these oscillations are generated, how they interact with external cues, and how they persist in the presence of noise.

Mathematical modeling has proven to be an invaluable tool for investigating biological rhythms. Drawing on the theory of dynamical systems, mathematical biologists have made important contributions to understanding the structure and behavior of biological oscillators. In addition, these systems are a rich source of topics for classroom explorations and student research projects.

Speakers in this IPS will illustrate the breadth of biological questions and mathematical techniques that are used to study the rhythms of life. They will highlight recent advances and open questions.

Organizer:

David Brown, The Colorado College

Order Emerging from Chaos: The Mathematics of Firefly Synchronization

1:30 P.M. - 1:50 P.M.

Matthew Mizuhara, The College of New Jersey

Optimizing Flexibility in the Collective Decisions of Honeybees

2:00 P.M. - 2:20 P.M.

Subekshya Bidari, University of Colorado

Patterns of Collective Oscillations: Effects of Modularity and Time-Delay

2:30 P.M. - 2:50 P.M.

Per Sebastian Skardal, Trinity College

Establishing a Theoretical Framework for Ultradian Forced Desynchrony Protocols

3:00 P.M. - 3:20 P.M.

Nora Stack, Colorado School of Mines

Multiple Time Scale Bursting Dynamics and Complex Bursting Patterns in Respiratory Neuron Models

3:30 P.M. - 3:50 P.M.

Yangyang Wang, The Ohio State University

CHRONOLOGICAL SCHEDULE CONTINUED

Friday, August 3 CONTINUED

Quasicycles in the Stochastic Hybrid Morris-Lecar Neural Model

4:00 P.M. - 4:20 P.M.

Heather Zinn Brooks, *University of Utah*

Investigation of Calcium Dynamics in Astrocytes via Bifurcation Analysis

4:30 P.M. - 4:50 P.M.

Greg Handy, *University of Utah*

AWM-MAA INVITED PAPER SESSION

Geometric Ideas and Where to Find Them

1:30 P.M. - 4:20 P.M., PLAZA BALLROOM D, PLAZA BUILDING

Results from geometry have long captivated the attention of mathematicians because of the surprising beauty, wide utility, and intriguing proofs behind the results. Geometric concepts are often a thread connecting areas of mathematics as well as a link between mathematics and other fields. In this session, we focus on new ways of looking at geometric theorems as well as applications to various fields of mathematics, including linear algebra, complex analysis, and dynamics.

Organizer:

Ulrich Daepf, Pamela Gorkin, and Karl Voss, *Bucknell University*

String Art and Calculus

1:30 P.M. - 1:50 P.M.

Greg Quenell, *State University of New York, Plattsburgh*

From Benford's Law to Poncelet's Theorem

2:00 P.M. - 2:20 P.M.

Karl Voss, *Bucknell University*

Ellipses ...

2:30 P.M. - 2:50 P.M.

Dan Kalman, *American University*

Geometry of the Earth and Universe

3:00 P.M. - 3:20 P.M.

Sarah Greenwald, *Appalachian State University*

The Graphic Nature of Gaussian Periods

3:30 P.M. - 3:50 P.M.

Sephan Garcia, *Pomona College*

Gaining Perspective on Homographies

4:00 P.M. - 4:20 P.M.

Annalisa Crannell, *Franklin & Marshall College*

CONTRIBUTED PAPER SESSION

Best Practices and Innovation in the Teaching of Discrete Mathematics

1:30 P.M. - 4:45 P.M., GOVERNOR'S SQUARE 10, PLAZA BUILDING

This session seeks presentations about innovative approaches to the teaching of Discrete Mathematics, the course generally required for computer science majors. Presentations could include illuminating projects and exercises, new approaches to the traditional curriculum, and ways to address new, interdisciplinary student populations. Presentations should focus on easily adaptable models and should discuss how stated learning objectives are attained.

Organizers:

Zsuzsanna Szaniszlo, *Valparaiso University*

Ágnes Bércesné Novák, *Peter Pazmany Catholic University*

Implementing WebAssign in Discrete Mathematics

1:30 P.M. - 1:45 P.M.

Kathleen Shannon, *Salisbury University*

IBL in Discrete Mathematics

1:50 P.M. - 2:05 P.M.

Breanne Garrett, *William Penn University*

Elizabeth Overturf, *William Penn University*

Kiera MacPherson, *William Penn University*

Count That Tune: Teaching Counting With Musical Examples

2:10 P.M. - 2:25 P.M.

Kurt Ludwick, *Salisbury University*

Discovering Binomial Coefficients

2:30 P.M. - 2:45 P.M.

Zsuzsanna Szaniszlo, *Valparaiso University*

Short Case Studies to Improve Student Understanding of Intricacies of Counting Problems

2:50 P.M. - 3:05 P.M.

Feryal Alayont, *Grand Valley State University*

Using the Boards of Board Games to Motivate Graphs

3:10 P.M. - 3:25 P.M.

Teena Carroll, *Emory & Henry College*

Video Project for a Discrete Math Course

3:30 P.M. - 3:45 P.M.

Anthony Bosman, *Andrews University*

Uncovering Critical Nodes in a Supply Chain: Connecting Graph and Network Theory to Supply Chain Risk Management

3:50 P.M. - 4:05 P.M.

Donna Beers, *Simmons College*

CHRONOLOGICAL SCHEDULE

Friday, August 3 CONTINUED

Writing and Revising to Conquer Proofs in Discrete Mathematics

4:10 P.M. - 4:25 P.M.

Jordan Tirrell, *Mount Holyoke College*

Counting the Keyspace of WWII's Enigma, and What it Can Teach us About Modern Cryptography

4:30 P.M. - 4:45 P.M.

Gregory V. Bard, *University of Wisconsin-Stout*

CONTRIBUTED PAPER SESSION

Fostering Undergraduate Interdisciplinarity

1:30 P.M. - 6:25 P.M., GOVERNOR'S SQUARE 15, PLAZA BUILDING

Mathematics is one educational tool to develop complex problem solvers that are needed to address many of the largest and most challenging problems in society, which are often interdisciplinary. This session invites speakers to present their efforts to foster interdisciplinary work by undergraduates within courses or outside the classroom.

Organizers:

Amanda Beecher, *Ramapo College of New Jersey*

Chris Arney, *United States Military Academy at West Point*

Sponsor: Consortium for Mathematics and Its Applications (COMAP)

Interdisciplinary Work At a Small Institution

1:30 P.M. - 1:45 P.M.

Kasie Farlow, *Dominican College*

How Does Climate Change Influence Regional Instability?

1:50 P.M. - 2:05 P.M.

Sijia Fan, *Skidmore College*

Ran Tao, *Skidmore College*

Kaifeng Yang, *Skidmore College*

Collaborating with Partner Disciplines to Develop Interdisciplinary Simulations, Case Studies, and Inquiry-Based Activities in Quantitative Reasoning

2:10 P.M. - 2:25 P.M.

Victor Piercey, *Ferris State University*

Incorporating Disciplinary Knowledge through Adaptive Learning Modules

2:30 P.M. - 2:45 P.M.

Michelle L. Isenhour, *Naval Postgraduate School*

Raluca Gera, *Naval Postgraduate School*

Connecting Disciplines Using Science Fiction

2:50 P.M. - 3:05 P.M.

Sarah Cobb, *Midwestern State University*

Jeff Hood, *Midwestern State University*

Peter Fields, *Midwestern State University*

Fauré or 4A: A Foray into the Math of Music

3:10 P.M. - 3:25 P.M.

Mark Rasmussen, *Siena Heights University*

Coordinated Calculus and Physics

3:30 P.M. - 3:45 P.M.

Kelly Black, *University of Georgia*

Guangming Yao, *Clarkson University*

Michael Ramsdell, *Clarkson University*

Craig Wiegert, *University of Georgia*

The Moose and Wolves Project: Uniting Differential Equations, Vector Calculus, and Population Ecology in a Case Study of the Isle Royale National Park

3:50 P.M. - 4:05 P.M.

Steven Morse, *United States Military Academy*

Stanley Florkowski, III, *United States Military Academy*

Lurch Validates Plato: An Application of Proof Verification Software to Philosophy

4:10 P.M. - 4:25 P.M.

Kenneth G. Monks, *University of Scranton*

Nathan Carter, *Bentley University*

Where To Draw The Line: Metrics of Gerrymandering

4:30 P.M. - 4:45 P.M.

Adeline R. Jacobsen, *University of Washington-Tacoma*

Connor Louis Myers, *University of Washington-Tacoma*

Building a Research Group on an Empty Lot

4:50 P.M. - 5:05 P.M.

Marcos Lopez, *Midwestern State University*

Terry Griffin, *Midwestern State University*

An Interdisciplinary Undergraduate Research Project in Compressor Surge Modeling

5:10 P.M. - 5:25 P.M.

Jeong-Mi Yoon, *University of Houston - Downtown*

Weining Feng, *University of Houston - Downtown*

Catastrophe Modeling: A Case Study in Vocational Curriculum

5:30 P.M. - 5:45 P.M.

John Haga, *Wentworth Institute of Technology*

What's the Damage? Modeling of Cholera Dynamics to Compute the Cost of Insurance

5:50 P.M. - 6:05 P.M.

Mami Wentworth, *Wentworth Institute of Technology*

CHRONOLOGICAL SCHEDULE CONTINUED

Friday, August 3 CONTINUED

Save the Cranes! Mathematical Modeling within an Environmental Conservation Effort

6:10 P.M. - 6:25 P.M.

Edward W. Swim, *Sam Houston State University*

John G. Alford, *Sam Houston State University*

CONTRIBUTED PAPER SESSION

Inquiry-Based Learning and Teaching, Part B

1:30 P.M. - 5:45 P.M., GOVERNOR'S SQUARE 14, PLAZA BUILDING

Organizers:

Brian Katz, *Augustana College*

Eric Kahn, *Bloomsburg University*

Victor Piercey, *Ferris State University*

Candice Price, *University of San Diego*

Xiao Xiao, *Utica College*

Amanda H. Matson, *Clarke University*

Mindy Capaldi, *Valparaiso University*

Kayla Dwelle, *Ouachita Baptist University*

Phong Le, *Goucher College*

An Online IBL Geometry Class

1:30 P.M. - 1:45 P.M.

Nathaniel Miller, *University of Northern Colorado*

Experience of a Noyce-student Learning Assistant in an Inquiry Based Learning Class

1:50 P.M. - 2:05 P.M.

Melissa Riley, *University of Nebraska at Omaha*

Michael E. Matthews, *University of Nebraska at Omaha*

Dora Matache, *University of Nebraska at Omaha*

Integrating a Learning Assistant Program with a Dedicated Learning Center

2:10 P.M. - 2:25 P.M.

Gina Monks, *Penn State Hazleton*

Sneaking IBL into College Prep Intermediate Algebra through 35-Minute Activities

2:30 P.M. - 2:45 P.M.

Chris Oehrlein, *Oklahoma City Community College*

Engaging Students in Algebraic Thinking by Pairing Coding with Active Learning Strategies

2:50 P.M. - 3:05 P.M.

Betty Love, *University of Nebraska - Omaha*

Victor Winter, *University of Nebraska - Omaha*

Michael Matthews, *University of Nebraska - Omaha*

Michelle Friend, *University of Nebraska - Omaha*

Angie Hodge, *Northern Arizona University*

Implementing Desmos Techivities to Promote Students' Covariational Reasoning

3:10 P.M. - 3:25 P.M.

Gary A. Olson, *University of Colorado Denver*

Heather Johnson, *University of Colorado Denver*

Jeremiah Kalir, *University of Colorado Denver*

The Effect of High School Reform on Students' Mathematical Achievements: Evidence from China

3:30 P.M. - 3:45 P.M.

Sijia Li, *Beijing National Day School*

Galit Eizman, *Harvard University*

The Effects of Mathematical Mindset on the Future Implementation of Inquiry-Based Learning Methods by Pre-Service Elementary Teachers

3:50 P.M. - 4:05 P.M.

Julia St. Goar, *Merrimack College*

Yvonne Lai, *University of Nebraska-Lincoln*

Knowing One's Goals for an IBL Proofs Course

4:10 P.M. - 4:25 P.M.

Annie Selden, *New Mexico State University*

John Selden, *New Mexico State University*

Bits of IBL: Modules in the Journal of Inquiry Based Learning in Mathematics

4:30 P.M. - 4:45 P.M.

Theron J. Hitchman, *University of Northern Iowa*

Student Critique as an Inquiry-Based Practice

4:50 P.M. - 5:05 P.M.

Britney Hopkins, *University of Central Oklahoma*

Jake Khoury, *Virginia Commonwealth University*

Where Did That Come From?

5:10 P.M. - 5:25 P.M.

Clark Wells, *Grand Valley State University*

Supporting Students' Defining as a Mathematical Practice

5:30 P.M. - 5:45 P.M.

Brian P. Katz, *Augustana College*

CHRONOLOGICAL SCHEDULE

Friday, August 3 CONTINUED

CONTRIBUTED PAPER SESSION

Mastery Grading, Part B

1:30 P.M. - 5:05 P.M., GOVERNOR'S SQUARE 11, PLAZA BUILDING

Organizers:

- David Clark**, *Grand Valley State University*
- Robert Campbell**, *College of Saint Benedict and Saint John's University*
- Jeb Collins**, *University of Mary Washington*
- Alyssa Hoofnagle**, *Wittenberg University*
- Mike Janssen**, *Dordt College*
- Austin Mohr**, *Nebraska Wesleyan University*
- Jessica OShaughnessy**, *Shenandoah University*
- Cassie Williams**, *James Madison University*

Standards Based Grading adopted to Mathematics Courses

- 1:30 P.M. - 1:45 P.M.
Jason Elsinger, *Florida Southern College*
Drew Lewis, *University of South Alabama*

Mastery-Based Testing in Calculus: The Easiest Hard Test Questions

- 1:50 P.M. - 2:05 P.M.
Justin Wright, *Plymouth State University*

Mastery Based Grading in the Calculus Classroom: Increasing Rigor, Improving Transparency, and Empowering Student Success

- 2:10 P.M. - 2:25 P.M.
Sharona Krinsky, *California State University Los Angeles*

Redesigning Calculus I with Standards Based Grading and Active Learning with Technology

- 2:30 P.M. - 2:45 P.M.
Sharon Lanaghan, *California State University, Dominguez Hills*
Kristen Stagg, *California State University, Dominguez Hills*

Implementing Mastery-Based Quizzes and Tests in a Calculus Course

- 2:50 P.M. - 3:05 P.M.
John Ross, *Southwestern University*

Using Mastery-Graded Homework to Promote Perseverance

- 3:10 P.M. - 3:25 P.M.
Austin Mohr, *Nebraska Wesleyan University*

On Mastery Grading in Proofs-Based Classes

- 3:30 P.M. - 3:45 P.M.
Emma Wright, *Plymouth State University*

It's Binary: Using Mastery Grading to Motivate Students to Become Good Coders

- 3:50 P.M. - 4:05 P.M.
Bevin Maultsby, *North Carolina State University*

Using Specifications Grading to Improve Students' Proof Writing Skills

- 4:10 P.M. - 4:25 P.M.
Chad Wiley, *Emporia State University*

Raising the Bar with Standards Based Grading

- 4:50 P.M. - 5:05 P.M.
Megan E. Selbach-Allen, *Stanford University*
Sarah J. Greenwald, *Appalachian State University*
Amy Ksir, *United States Naval Academy*
Jill Thomley, *Appalachian State University*

CONTRIBUTED PAPER SESSION

Priming the Calculus Pump: Fresh Approaches to Teaching First-Year Calculus, Part B

1:30 P.M. - 5:25 P.M., GOVERNOR'S SQUARE 16, PLAZA BUILDING

Organizers:

- Chuck Garner**, *Rockdale Magnet School for Science and Technology*
- Bob Sachs**, *George Mason University*

Sponsor: *The SIGMAA on Teaching Advanced High School Mathematics (SIGMAA TAHSM)*

Reconceptualizing the Integral and the Fundamental Theorem

- 1:30 P.M. - 1:45 P.M.
Robert Sachs, *George Mason University*

Interleaving Derivative Rules and Applications in Calculus I

- 1:50 P.M. - 2:05 P.M.
Melissa Lindsey, *Dordt College*

Enhancing a First-Year Calculus Course with Mathematica Assignments

- 2:10 P.M. - 2:25 P.M.
Jessica Kelly, *Christopher Newport University*

First Year Calculus with Python Coding

- 2:30 P.M. - 2:45 P.M.
Jiyeon Suh, *Grand Valley State University*

We Integrate Differentials, Not Functions

- 2:50 P.M. - 3:05 P.M.
Robert R. Rogers, *SUNY Fredonia*

RIP: Row Integration by Parts

- 3:10 P.M. - 3:25 P.M.
John Rock, *Cal Poly Pomona*

CHRONOLOGICAL SCHEDULE CONTINUED

Friday, August 3 CONTINUED

Logs in Calculus and Maybe More.....

3:30 P.M. - 3:45 P.M.

Marshall Ransom, *Georgia Southern University*

Estimating Pi as an Introduction to Limits in Calculus I

3:50 P.M. - 4:05 P.M.

Eric Miles, *Colorado Mesa University*

A Necessary Condition for Priming the Calculus Pump: Preparing Graduate Students to Teach

4:10 P.M. - 4:25 P.M.

Jack Bookman, *Duke University*

Michael Jacobson, *University of Colorado Denver*

Differentials, Not Derivatives

4:30 P.M. - 4:45 P.M.

Eugene Boman, *Penn State, Harrisburg Campus*

Math Placement at the Coast Guard Academy

4:50 P.M. - 5:05 P.M.

Eric C. Johnson, *U.S. Coast Guard Academy*

Implementing Modeling Practices in Calculus at a Hispanic-Serving Institution

5:10 P.M. - 5:25 P.M.

Adam Castillo, *Florida International University*

Charity Watson, *Florida International University*

Geoff Potvin, *Florida International University*

Laird Kramer, *Florida International University*

CONTRIBUTED PAPER SESSION

Ready or Not: Corequisite Courses and Just-in-Time Review

1:30 P.M. - 5:05 P.M., GOVERNOR'S SQUARE 17, PLAZA BUILDING

Many students enter college not yet ready for college-level mathematics. For some, embedded just-in-time review can fill in gaps, but for underprepared students many colleges and universities are showing greater success with "corequisite" courses to increase completion, especially for underserved populations. Talks describing the curricular change process are welcome, especially examples of successful responses to rapid large-scale implementation requirements.

Organizers:

Rebecca Hartzler, *University of Texas at Austin*

Suzanne Dorée, *Augsburg University*

Frank Savina, *University of Texas at Austin*

Co-requisite Courses: The Right Math at the Right Time

1:30 P.M. - 1:45 P.M.

Francisco Savina, *The University of Texas at Austin*

Corequisite Implementation at Missouri Western State University

1:50 P.M. - 2:05 P.M.

Lori McCune, *Missouri Western State University*

Corequisite College Algebra at Illinois

2:10 P.M. - 2:25 P.M.

Alison Reddy, *Univeristy of Illinois*

Get AMPed About Corequisite Courses

2:30 P.M. - 2:45 P.M.

Mary B. Walkins, *The Community College of Baltimore County*

Jesse Kiefner, *The Community College of Baltimore County*

Helping Developmental Students Enter into College Level Mathematics Courses

2:50 P.M. - 3:05 P.M.

Andy Richards, *Central Washington University*

College Algebra and Trigonometry Enhanced: A Co-Requisite Model with "Lab-Style" Explorations

3:10 P.M. - 3:25 P.M.

Kenneth A. Parker, *NYC College of Technology*

Peer Facilitator Led Support Courses for Precalculus

3:30 P.M. - 3:45 P.M.

Emily Gismervig, *University of Washington Bothell*

Cinnamon Hillyard, *University of Washington Bothell*

The Journey to Co-remediation

3:50 P.M. - 4:05 P.M.

Eileen C. McGraw, *Stevenson University*

Sarah G. Blanset, *Stevenson University*

Thairen G. Dade, *Stevenson University*

Just-In-Time Mathematics Support Using Online Modules: Findings from a Multi-Institutional Project

4:10 P.M. - 4:25 P.M.

Rachel Weir, *Allegheny College*

John Meier, *Lafayette College*

Meeting Students Where They Are: Supplemental Instruction in Large-Scale Quantitative Literacy Courses

4:30 P.M. - 4:45 P.M.

Samuel Luke Tunstall, *Michigan State University*

Becky Matz, *Michigan State University*

CHRONOLOGICAL SCHEDULE

Friday, August 3 CONTINUED

Making Waves in Math Placement

4:50 P.M. - 5:05 P.M.

Kathy Andrist, *Utah Valley University*

Using Corequisite Remediation to Overcome Barriers in Technology

5:10 P.M. - 5:25 P.M.

Nicholas Shay, *Central Ohio Technical College*

CONTRIBUTED PAPER SESSION

Recreational Mathematics: Puzzles, Card Tricks, Games, Gambling and Sports, Part B

1:30 P.M. - 5:25 P.M., GRAND BALLROOM II, TOWER BUILDING

Organizers:

Paul R. Coe, *Dominican University*

Sara B. Quinn, *Dominican University*

Kristen Schemmerhorn, *Concordia University Chicago*

Andrew Niedermaier, *Jane Street Capital*

Mathematical Card Tricks

1:30 P.M. - 1:45 P.M.

Arthur Benjamin, *Harvey Mudd College*

New Card Trick: “Predicting the Finalists”

1:50 P.M. - 2:05 P.M.

Jang-Woo Park, *University of Houston-Victoria*

Ricardo Teixeira, *University of Houston-Victoria*

War, What Is It Good For?

2:10 P.M. - 2:25 P.M.

Robert Wolverton, *US Air Force Academy*

Using Games as a Context for Mathematical Modeling

2:30 P.M. - 2:45 P.M.

Jathan Austin, *Salisbury University*

Penney’s Game with Strange Coins

2:50 P.M. - 3:05 P.M.

Robert W. Vallin, *Lamar University*

Markov Chains, Your Children, and You

3:10 P.M. - 3:25 P.M.

David McCune, *William Jewell College*

Lori McCune, *Missouri Western State University*

Can Camels Compute Conditional Probability? An Analysis of Camel Up

3:30 P.M. - 3:45 P.M.

Thomas J. Clark, *Dordt College*

The Warden’s Game: An Application of de Bruijn Sequences

3:50 P.M. - 4:05 P.M.

Joseph M. DiMuro, *Biola University*

The Vanishing Square Puzzle and the Fibonacci Sequence

4:10 P.M. - 4:25 P.M.

Stephen Andrilli, *La Salle University*

Sum Fun with Fibonacci and Friends

4:30 P.M. - 4:45 P.M.

Edmund A. Lamagna, *University of Rhode Island*

Robert A. Ravenscroft, Jr., *Rhode Island College*

A Covering Property for Digital Root Series

4:50 P.M. - 5:05 P.M.

Jeremiah Bartz, *University of North Dakota*

Exploring The “Reverse” Lucas Sequence 3, 1, 4, 5, 9, ...

5:10 P.M. - 5:25 P.M.

Jay L. Schiffman, *Rowan University*

CONTRIBUTED PAPER SESSION

Teaching Undergraduate Mathematics with Primary Historical Sources, Part A

1:30 P.M. - 4:45 P.M., GOVERNOR’S SQUARE 12, PLAZA BUILDING

In recent years, there has been an increasing interest in using primary historical sources to teach undergraduate mathematics. This approach has been used by a wide variety of faculty, including those with little background in mathematics history. This session brings together developers of materials for teaching with primary sources, instructors who teach with primary sources, and mathematics education researchers.

Organizers:

Dominic Klyve, *Central Washington University*

Maria Zack, *Point Loma Nazarene University*

Jeff Suzuki, *Brooklyn College*

Through the Looking Glass: Dodgson and Determinants

1:30 P.M. - 1:45 P.M.

Maria Zack, *Point Loma Nazarene University*

Modern Algebra—A Collection of Mathematical TRIUMPHS

1:50 P.M. - 2:05 P.M.

Adam Glesser, *California State University, Fullerton*

Mathematical Communication: the Unexpected Benefit of Using PHSs

2:10 P.M. - 2:25 P.M.

Matthew Cathey, *Wofford College*

CHRONOLOGICAL SCHEDULE CONTINUED

Friday, August 3 CONTINUED

History of Math with Only Primary Sources
2:30 P.M. - 2:45 P.M.
Anne Duffee, Sewanee: the University of the South

Creating Calculus Projects Using Primary Sources
2:50 P.M. - 3:05 P.M.
Shawna Mahan, Pikes Peake Community College

Geometrical Approaches to Calculus Problems
3:10 P.M. - 3:25 P.M.
Andrew Leahy, Knox College

From History of Mathematics to Topics Courses
3:30 P.M. - 3:45 P.M.
Meagan C. Herald, Virginia Military Institute

Understanding Desargues in an Historical Context
3:50 P.M. - 4:05 P.M.
Carl Lienert, Fort Lewis College

Should We Call It the Abel-Dirichlet Theorem?
4:10 P.M. - 4:25 P.M.
David Ruch, Metropolitan State University of Denver
Joshua Gonzales, Metropolitan State University of Denver
Ahern Nelson, Metropolitan State University of Denver

An Old Babylonian Procedure Text and a Table of Reciprocals
4:30 P.M. - 4:45 P.M.
Zoë Misiewicz, SUNY Oneonta and ISAW-NYU

PANEL SESSION

Best Practices for Teaching Mathematics Online

1:30 P.M. - 2:50 P.M., PLAZA BALLROOM F, PLAZA BUILDING

The MAA Professional Development Committee is sponsoring this panel discussion on best practices for teaching online. In this session panelists will share what has worked well for them, what needs to be improved, and what they would not do again. This session will have three panel members with each member having considerable experience in delivering online courses.

Organizer:
Kyle Riley, South Dakota School of Mines & Technology

Panelists:
Radu Cascaval, University of Colorado Colorado Springs
Erica Hastert, Early College of Arvada
Linda Sundbye, Metropolitan State University of Denver

Sponsor: MAA Professional Development Committee

WORKSHOP

Meeting the Challenge of Introducing Senior High School Students to Contemporary Mathematics

1:30 P.M. - 2:50 P.M., TOWER COURT D, TOWER BUILDING

Consider the challenge mentioned in the title, why meet it and how? Our suggestion consists of periodically interweaving Mathematics-News-Snapshots (MNSs). We'll examine a sample MNS against the rationale and the guidelines for MNS authors. Results from interweaving 21 different MNSs in Israel will be followed by a call for collaboration in (i) Developing new MNSs; (ii) Implementing existing MNSs empirically.

Organizers:
Nitsa B. Movshovitz-Hadar and Boaz Silberman, Technion

Sponsor: The SIGMAA on Teaching Advanced High School Mathematics (SIGMAA TAHSM)

MINICOURSE

Minicourse 1. Initiating, Designing, Building, and Using Modeling Scenarios for Teaching Differential Equations, Part B

1:30 P.M. - 3:30 P.M., TOWER COURT A, TOWER BUILDING

Brian Winkel, SIMIODE
Eric Sullivan, Carroll College
Lisa Driskell, Colorado Mesa University
Audrey Malagon, Virginia Wesleyan University

Sponsor: Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations (SIMIODE)

MINICOURSE

Minicourse 6. Visualizing Projective Geometry Through Photographs and Perspective Drawings, Part B

1:30 P.M. - 3:30 P.M., TOWER COURT B, TOWER BUILDING

Annalisa Crannell, Franklin & Marshall College
Fumiko Futamura, Southwestern University

UNDERGRADUATE STUDENT ACTIVITY

The Case of the Missing Vertex

1:30 P.M. - 2:20 P.M., GRAND BALLROOM I, TOWER BUILDING

A vertex has gone missing in an un-labeled graph and taken all of its edges with it. Can we reconstruct the original graph, or at least some of its properties? What if we have the vertex-deleted graph for each of the vertices? Come join this mathematical investigation of the Graph Reconstruction Problem. This fanciful activity provides an introduction to Graph Theory and leads to an open question in the research. Bring a friend and writing utensil.

CHRONOLOGICAL SCHEDULE

Friday, August 3 CONTINUED

Presenter:

Suzanne Dorée, *Augsburg University*

OTHER MATHEMATICAL SESSION
Alder Award Session

2:30 P.M. - 3:50 P.M., PLAZA BALLROOM, A, B, & C, PLAZA BUILDING

The MAA established the Henry L. Alder Award for Distinguished Teaching by a Beginning College or University Mathematics Faculty Member to honor beginning college or university faculty members whose teaching has been extraordinarily successful and whose effectiveness in teaching undergraduate mathematics is shown to have influence beyond their own classrooms. Each year, at most three college or university teachers are honored with this national award. The awardees are invited to make a presentation in this session. The session is moderated by MAA President Deanna Haunsperger.

Creativity Amidst Adversity

2:30 P.M. - 2:50 P.M.

Mohamed Omar, *Harvey Mudd College*

Way to Fail!

3:00 P.M. - 3:20 P.M.

David Clark, *Grand Valley State University*

Mathematics by Design

3:30 P.M. - 3:50 P.M.

Chad Awtrey, *Elon University*

UNDERGRADUATE STUDENT PAPER SESSION
MAA Student Paper Sessions

2:30 P.M. - 4:30 P.M., PLAZA COURTS 1-4, PLAZA BUILDING

Organizers:

Eric Ruggieri, *College of the Holy Cross*

Chasen Smith, *Georgia Southern University*

PANEL SESSION

Nonacademic Career Paths for Undergraduate Mathematics Majors

3:00 P.M. - 4:20 P.M., PLAZA BALLROOM F, PLAZA BUILDING

You're about to earn a degree in mathematics. Now what? You may be surprised to know that teaching isn't your only option; in the "real world," mathematical knowledge is a valued commodity, and there are many interesting job opportunities for mathematicians in nonacademic settings. Whether you are a mathematics student looking for a job once you graduate or an advisor looking for advice to give to future job-seeking students,

this session will help you gain new perspectives on nonacademic career experiences and what employers value in their employees. Panelists will share their paths to their current positions and offer advice to others looking for employment in similar venues.

Organizers:

Pamela Richardson, *Westminster College*

Violeta Vasilevska, *Utah Valley University*

Panelists:

Erin Valenti Bawa, *Monticello Associates*

Stephanie Fitchett, *Transamerica*

Emilie Purvine, *Pacific Northwest National Laboratory*

Tyler Rust, *Fast Enterprises*

Sponsor: *MAA Committee on Undergraduate Student Activities (CUSA)*

POSTER SESSION

PosterFest 2018: Scholarship by Early Career Mathematicians

3:00 P.M. - 4:30 P.M., PLAZA EXHIBIT HALL, PLAZA BUILDING

This poster session will allow early career mathematicians, including untenured faculty and graduate students, to present and discuss their scholarly activities with other attendees in an informal atmosphere. Examples of scholarly activities suitable for this poster session include expository work, preliminary reports, scholarship of teaching and learning, and research reports.

Organizers:

Eric A. Eager, *University of Wisconsin La Crosse*

Lisa Driskell, *Colorado Mesa University*

Sponsors: *MAA Committee on Early Career Mathematicians
Young Mathematicians Network Project NEXt*

WORKSHOP

Mathematical Puzzle Programs: Outreach and Recruitment with Puzzles

3:10 P.M. - 4:30 P.M., TOWER COURT D, TOWER BUILDING

MaPP designs mathematical puzzle hunts for use in university outreach programs. Participating middle/high school students work in teams to solve fun mathematical puzzles based on contemporary mathematics research, many of which decode to locations around the host campus hiding more puzzles. Workshop participants will experience a mini-puzzle hunt for themselves and learn how to partner their institution with MaPP.

Organizers:

Braxton Carrigan, *Southern Connecticut State University*

Steven Clontz, *University of South Alabama*

PJ Couch, *Lamar University*

CHRONOLOGICAL SCHEDULE CONTINUED

Friday, August 3 CONTINUED

MINICOURSE

Minicourse 3. An Introduction to WeBWork: An Open Source Alternative for Generating and Delivering Online Homework Problems, Part A

4:00 P.M. – 6:00 P.M., TOWER COURT A, TOWER BUILDING

Participants will learn to utilize the opensource online homework system WeBWork. Adopted by over 1200 institutions, WeBWork includes an extensive, curated library of over 35,000 exercises encompassing the collegiate curriculum. Subjects include College Algebra, Calculus, ODEs, Linear Algebra, Statistics, and Introduction to Proofs. Participants will learn how to utilize WeBWork in their classrooms and to edit WeBWork exercises.

John Travis, *Mississippi College*

Robin Cruz, *College of Idaho*

Tim Flowers, *Indiana University of Pennsylvania*

Sponsor: MAA Committee on Technology in Mathematics Education (CTIME)

MINICOURSE

Minicourse 4. Leading a Successful Program Review, Part A

4:00 P.M. – 6:00 P.M., TOWER COURT B, TOWER BUILDING

Designed for faculty members preparing to lead program reviews in the next year or so, this mini-course covers the reasons for undertaking a program, how to write the self-study, the role of an external consultant, pitfalls that one might anticipate and how to avoid them. The mini-course will also interest faculty who are willing to serve as an external consultant.

Rick Gillman, *Valparaiso University*

Henry Walker, *Grinnell College*

Sponsor: MAA Committee on Departmental Reviews

PANEL SESSION

Using Your MAA Departmental Membership

FRIDAY, AUGUST 3, 4:30 P.M. - 5:50 P.M., PLAZA BALLROOM F, PLAZA BUILDING

The relatively new MAA Departmental Membership allows member departments to give free student memberships to as many students as they wish. But once all your students are members, what do you do? We will explore how departments are using MAA resources with their student members to enrich teaching, create Math Club activities, generate capstone experiences, and more.

Organizer:

Kira Hamman, *Penn State Mont Alto*

Panelists:

Ximena Catepillan, *Millersville University*

Diane Davis, *Metropolitan State University of Denver*

Joyati Debnath, *Winona State University*

Larry Gratton, *Berea College*

Fernando Gouvea, *Colby College*

Sponsor: MAA Membership Committee

SIGMAA ACTIVITY

IBL SIGMAA Guest Lecture

6:00 P.M. – 6:50 P.M., GRAND BALLROOM II, TOWER BUILDING

Inspire through Inquiry-Based Learning

Angie Hodge, *Northern Arizona University*

Inquiry-based learning has been shown to help all students learn mathematics, but IBL has a powerful component that goes beyond the mathematics classroom. IBL can help students with developing thinking skills, making informed life choices, building lifelong relationships, and opening doors to career paths not otherwise considered. In this session, I will engage the audience in a reflective session on how we can all inspire others by using IBL methods of teaching in our classrooms.

SOCIAL EVENT

Pi Mu Epsilon Banquet

6:00 P.M. - 7:45 P.M., GRAND BALLROOM I, TOWER BUILDING

All PME members and their supporters are welcome. See the registration form for more information on this ticketed event.

SIGMAA ACTIVITY

IBL SIGMAA Reception and Business Meeting

7:00 P.M. – 7:30 P.M., GRAND BALLROOM II, TOWER BUILDING

OTHER MATHEMATICAL SESSION

Uniform Convergence: A One-Woman Play

8:00 P.M. - 9:30 P.M., PLAZA BALLROOM F, PLAZA BUILDING

Uniform Convergence is a one-woman play, written and performed by mathematics graduate student Corrine Yap. It juxtaposes the stories of two women trying to find their place in a white male-dominated academic world. The first is of historical Russian mathematician Sofia Kovalevskaya, who was lauded as a pioneer for women in science but only after years of struggle for recognition. Her life's journey is told through music and movement, in both Russian and English. The second is of a fictional Asian-American woman, known only as "Professor," attempting to cope with the prejudice she faces in the present. As she teaches an introductory real analysis class, she uses mathematical concepts to draw parallels to the race and gender conflicts she encounters in society today.

CHRONOLOGICAL SCHEDULE

Friday, August 3 CONTINUED

SESSION FOR UNDERGRADUATE STUDENTS

MAA Ice Cream Social

9:00 P.M. - 10:00 P.M., NORTH CONVENTION LOBBY, TOWER BUILDING

Besides cake and ice cream, we will recognize all students who gave talks in the MAA Student Paper Sessions, and award prizes for the best of them. All are invited.

Saturday, August 4

Registration

8:00 A.M. - 3:00 P.M., PLAZA REGISTRATION, PLAZA BUILDING

Exhibit Hall

9:00 A.M. - 12:30 P.M., PLAZA EXHIBIT HALL, PLAZA BUILDING

INVITED ADDRESS

MAA James R.C. Leitzel Lecture

The Relationship between Culture and the Learning of Mathematics

9:00 A.M. - 9:50 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Talitha Washington, *Howard University and National Science Foundation*

How do we ensure that our mathematics is culturally inclusive? Why have issues with minority participation not been resolved? Unfortunately, even with our best intentions, our implicit biases impact the mathematics we teach and learn. We all can take an active role to ensure the strength of our future mathematical community, which should also be a reflection of our Nation. I will share how to infuse various cultures in learning mathematics that can better help educate those of diverse backgrounds which will broaden the participation of those doing mathematics.

CONTRIBUTED PAPER SESSION

Inquiry-Based Learning and Teaching, Part C

9:00 A.M. - 12:15 P.M., GOVERNOR'S SQUARE 14, PLAZA BUILDING

Organizers:

Brian Katz, *Augustana College*

Eric Kahn, *Bloomsburg University*

Victor Piercey, *Ferris State University*

Candice Price, *University of San Diego*

Xiao Xiao, *Utica College*

Amanda H. Matson, *Clarke University*

Mindy Capaldi, *Valparaiso University*

Kayla Dwelle, *Ouachita Baptist University*

Phong Le, *Goucher College*

Improving Student Learning in Multivariable Calculus through Research Projects

9:00 A.M. - 9:15 A.M.

Na Yu, *Lawrence Technological University*

Calculus 1 + IBL + January term =

9:20 A.M. - 9:35 A.M.

Joe Benson, *Macalester College*

Encouraging STEM Student Self-Consciousness about "English-Units"

9:40 A.M. - 9:55 A.M.

Ann L. Von Mehren, *Bowling Green State University*

Overcoming Resistance to Inquiry-Based Learning in a Math for Liberal Arts Class

10:00 A.M. - 10:15 A.M.

Benjamin Gaines, *Iona College*

Assessment Projects in an IBL Proofs Course

10:20 A.M. - 10:35 A.M.

Martha Byrne, *Sonoma State University*

Supporting Unconfident Proof Writers in IBL Euclidean Geometry

10:40 A.M. - 10:55 A.M.

David Clark, *Grand Valley State University*

Matrix Representations as a Gateway to Group Theory

11:00 A.M. - 11:15 A.M.

Paul E. Becker, *Penn State Behrend*

Mark Medwid, *Rhode Island College*

Teaching Number Theory From Scratch

11:20 A.M. - 11:35 A.M.

Ian Whitehead, *Macalester College*

Discovery Learning in an Interdisciplinary Course on Finite Fields and Applications

11:40 A.M. - 11:55 A.M.

Christopher O'Neill, *San Diego State University*

Lily Silverstein, *University of California Davis*

A Technique to Discover the Cauchy-Euler Equation While Reviewing Differential Calculus

12:00 P.M. - 12:15 P.M.

Jonathan Weisbrod, *Rowan College at Burlington County*

CHRONOLOGICAL SCHEDULE CONTINUED

Saturday, August 4 CONTINUED

CONTRIBUTED PAPER SESSION

Priming the Calculus Pump: Fresh Approaches to Teaching First-Year Calculus, Part C

9:00 A.M. - 11:55 A.M., GOVERNOR'S SQUARE 16, PLAZA BUILDING

Organizers:

Chuck Garner, Rockdale Magnet School for Science and Technology
Bob Sachs, George Mason University

Sponsor: The SIGMAA on Teaching Advanced High School Mathematics (SIGMAA TAHSM)

Modeling with Calculus: the Practical and the Whimsical

9:00 A.M. - 9:15 A.M.

Emma Smith Zbarsky, Wentworth Institute of Technology
Mel Henriksen, Wentworth Institute of Technology
Gary Simundza, Wentworth Institute of Technology

Modeling the Physical World: An Integrated Math and Physics Course

9:20 A.M. - 9:35 A.M.

Nathan Pennington, Creighton University

Ximera and Calculus Coordination

9:40 A.M. - 9:55 A.M.

James M. Talamo, The Ohio State University
Nela Lakos, The Ohio State University

Personalizing Placement with a Multi-Faceted Approach

10:00 A.M. - 10:15 A.M.

Paul N. Rynnion, Missouri University of Science and Technology
Stephanie L. Fitch, Missouri University of Science and Technology

Connected With Calculus: Building Community Online

10:20 A.M. - 10:35 A.M.

Jennifer Elyse Clinkenbeard, CSU Channel Islands, CSU Monterey Bay
Cynthia Wyels, CSU Channel Islands

The Effect of Flipping Calculus on Attitudes, Behaviors, and Performance

10:40 A.M. - 10:55 A.M.

Trefor Bazett, University of Cincinnati

A Flipped Classroom Approach to a Summer Calculus Course

11:00 A.M. - 11:15 A.M.

Daniel Watson, Mississippi College

Calculus - Twice Flipped

11:20 A.M. - 11:35 A.M.

Ann Marie Harmon, Brigham Young University - Idaho

Flipping the Semester: A New Radical Problem-Solving Approach for Teaching Calculus

11:40 A.M. - 11:55 A.M.

Sukanya Basu, University of Michigan - Ann Arbor

CONTRIBUTED PAPER SESSION

Recreational Mathematics: Puzzles, Card Tricks, Games, Gambling and Sports, Part C

9:00 A.M. - 11:35 A.M., GRAND BALLROOM II, TOWER BUILDING

Organizers:

Paul R. Coe, Dominican University
Sara B. Quinn, Dominican University
Kristen Schemmerhorn, Concordia University Chicago
Andrew Niedermaier, Jane Street Capital

The Continuing Saga of the Hardest Logic Puzzle Ever

9:00 A.M. - 9:15 A.M.

Jason Rosenhouse, James Madison University

Knights and Knaves and Naive Set Theory

9:20 A.M. - 9:35 A.M.

Oscar Levin, University of Northern Colorado
Tyler Markkanen, Springfield College

Open Problems in the Game of Lazy Cops and Robbers on Graphs

9:40 A.M. - 9:55 A.M.

Brendan W. Sullivan, Emmanuel College

A Spectrum of Solutions for a Set of Cyclic Groupdoku

10:00 A.M. - 10:15 A.M.

David Nacin, William Paterson University

Using Games for Teaching Mathematical Concepts

10:20 A.M. - 10:35 A.M.

Guoan Diao, Holy Family University

Evaluating Hackenbush Positions

10:40 A.M. - 10:55 A.M.

Paul Olson, Penn State Erie, Behrend

CHRONOLOGICAL SCHEDULE

Saturday, August 4 CONTINUED

Fractal Tiling Puzzles

11:00 A.M. - 11:15 A.M.

Michael Barnsley, *Australian National University*

Andrew Vince, *Australian National University*

Louisa Barnsley, *Australian National University*

Challenging Knight's Tours

11:20 A.M. - 11:35 A.M.

Sam K. Miller, *Harvey Mudd College*

Arthur T. Benjamin, *Harvey Mudd College*

SESSION FOR UNDERGRADUATE STUDENTS

MAA Mathematical Competition in Modeling (MCM) Winners

9:00 A.M. - 10:15 A.M., GRAND BALLROOM I, TOWER BUILDING

About 20,000 teams, each consisting of three undergraduates, entered the 2018 Mathematical Contest in Modeling in February. Teams chose one of two real-world problems. Teams have four days to deal with the MCM challenge and may use or access any inanimate source – computers, libraries, the Web, etc. MAA judges choose a winner for each problem. The two MAA winning teams of students will present their results of the MCM four-day challenge.

Organizer:

Ben Fusaro, *Florida State University*

INVITED ADDRESS

Earle Raymond Hedrick Lecture Series

Nonlinear Dispersive Equations and the Beautiful Mathematics That Comes with Them, Lecture III

10:00 A.M. - 10:50 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Gigliola Staffilani, *Massachusetts Institute of Technology*

In these lectures I will give an overview of the rich mathematical structures that characterize the wave solutions of some of the most important nonlinear partial differential equations, such as the Schrödinger equation. In doing so I will illustrate how beautiful pieces of mathematics, developed using different tools, not just coming from analysis, have been generated over the years in order to answer some of the most fundamental questions for these equations, such as existence and uniqueness of solutions for example. Along the way I will formulate open questions and possible new directions of investigation.

OTHER MATHEMATICAL SESSION

Math Teachers' Circle Demonstration

10:00 A.M. - 11:30 A.M., MAJESTIC BALLROOM, TOWER BUILDING

A Math Teachers' Circle is a professional development experience that brings mathematics professionals in direct contact with teachers. Circles foster passion and excitement for deep mathematics and give teachers a chance to connect with like-minded colleagues. This demonstration session offers the opportunity for conference attendees to observe and then discuss a Math Teachers' Circle experience designed for local teachers. While the teachers are engaged in a mathematical investigation, mathematicians will have a discussion focused on appreciating and better understanding the organic and creative process of learning that circles offer, and on the logistics and dynamics of running an effective circle.

Organizers:

Laura Janssen and **Tom Clark**, *Dordt College*

Sponsor: *The SIGMAA for Math Circles for Students and Teachers (SIGMAA-MCST)*

INVITED ADDRESS

MAA Invited Address

Snow Business: Scientific Computing in the Movies and Beyond

11:00 A.M. - 11:50 A.M., PLAZA BALLROOM A, B, & C, PLAZA BUILDING

Joseph Teran, *University of California Los Angeles*

New applications of scientific computing for solid and fluid mechanics problems include simulation of virtual materials in movie visual effects and virtual surgery. Both disciplines demand physically realistic dynamics for materials like water, smoke, fire, and soft tissues. New algorithms are required for each area. Teran will speak about the simulation techniques required in these fields and will share some recent results including: simulated surgical repair of biomechanical soft tissues; extreme deformation of elastic objects with contact; high resolution incompressible flow; and clothing and hair dynamics. He will also discuss a new algorithm used for simulating the dynamics of snow in Disney's animated feature film, "Frozen".

COMMITTEE MEETING

MAA Business Meeting

1:00 P.M. - 1:20 P.M., PLAZA BALLROOM D, PLAZA BUILDING

The meeting is organized by MAA Secretary James Sellers, Penn State University, and is chaired by MAA President Deanna Haunsperger, Carleton College.

CHRONOLOGICAL SCHEDULE CONTINUED

Saturday, August 4 CONTINUED

CONTRIBUTED PAPER SESSION

Modeling-Based Teaching and Learning in Differential Equations Courses

1:00 P.M. - 4:55 P.M., GOVERNOR'S SQUARE 15, PLAZA BUILDING

This session features talks about modeling-based teaching in differential equations courses and descriptions of modeling activities in a course from speakers who are beginning to use modeling and those with more experience. Talks featuring real data (collected or cited) and a full modeling process for students are offered. Evidence of the success of individual approaches will be given.

Organizers:

Brian Winkel, *Director SIMIODE*

Lisa Driskell, *Associate Professor of Mathematics at Colorado Mesa University*

Audrey Malagon, *Batten Associate Professor of Mathematics, Virginia Wesleyan University*

Air Water Rocket as Class Project

1:00 P.M. - 1:15 P.M.

John T. Sieben, *Texas Lutheran University*

Reza Abbasian, *Texas Lutheran University*

It's Close to Rocket Science

1:20 P.M. - 1:35 P.M.

Gerard Ornas, *McNeese State University*

A Boundary Value Problem Modeling-Exercise: Beam Equation

1:40 P.M. - 1:55 P.M.

Jim Fischer, *Oregon Institute of Technology*

Tiernan Fogarty, *Oregon Institute of Technology*

Estimation of the Thermal Properties of a Wall using Temperature and Heat Flux Measurements

2:00 P.M. - 2:15 P.M.

Marco Scavino, *Universidad de la República*

Marco Iglesias, *University of Nottingham*

Zaid Sawlan, *King Abdullah University of Science and Technology*

Raúl Tempone, *King Abdullah University of Science and Technology*

Christopher Wood, *University of Nottingham*

The Past, Present, and Future of Endangered Whale Populations

2:20 P.M. - 2:35 P.M.

Glenn Ledder, *University of Nebraska-Lincoln*

Modeling with Differential Equations (MA153) Course Changes and Project Ideas

2:40 P.M. - 2:55 P.M.

Ryan Miller, *United States Military Academy*

Coexistence and Competition

3:00 P.M. - 3:15 P.M.

Jean Marie Linhart, *Central Washington University*

Daniel Roelke, *Texas A&M University*

Modeling, Team Based Computer Lab Materials in Differential Equations: Implementation and Outcomes

3:20 P.M. - 3:35 P.M.

Peter G. LaRose, *University of Michigan*

Discrete-Space Continuous-Time and Discrete-Time Continuous-Space Modeling

3:40 P.M. - 3:55 P.M.

Namyong Lee, *Minnesota State University, Mankato*

Sequential Course Activities Constructing a One Predator Two Prey Model Incorporating an Allee Threshold and Indirect Prey-Prey Effects

4:00 P.M. - 4:15 P.M.

Christopher Brown, *California Lutheran University*

Dynamics of Gestational Diabetes: A Model-Based Analysis

4:20 P.M. - 4:35 P.M.

Hasala Senpathy K. Gallolu Kankanamalage, *Roger Williams University*

Maxima Modeling for Differential Equations

4:40 P.M. - 4:55 P.M.

Leon Kaganovskiy, *Touro College Brooklyn Campus*

GRADUATE STUDENT PAPER SESSION

Great Talks for a General Audience: Coached Presentations by Graduate Students

1:00 P.M. - 5:00 P.M., GOVERNOR'S SQUARE 9, 10, 14 PLAZA BUILDING

In this session graduate students give talks aimed at an undergraduate audience. Both the talks and abstracts should be designed to excite a wide range of undergraduates about mathematics.

Organizers:

Jim H. Freeman, *Cornell College*

May Mei, *Denison University*

Ranjan Rohatgi, *Saint Mary's College*

Aliza Steurer, *Dominican University*

Sponsor: MAA Committee on Graduate Students

CHRONOLOGICAL SCHEDULE

Saturday, August 4 CONTINUED

INVITED PAPER SESSION

Category Theory for All

1:30 P.M. - 4:20 P.M., PLAZA BALLROOM D, PLAZA BUILDING

Category theory can be thought of as being “very abstract algebra”. It is typically taught at graduate school or in some select cases to advanced undergraduates. In this session we will show ways in which category theory can be taught in a meaningful way to undergraduates and those without particularly aptitude or expertise in math, even high school and middle school students. In the process, we will emphasize important aspects of mathematics that are not to do with solving problems, proving theorems, or getting the right answer, including: making connections between different situations, illuminating deep structures, finding fundamental reasons for things, and improving the clarity of our thinking. The talks will be of interest for general enrichment as well as pedagogy.

Organizer:

Eugenia Cheng, *School of the Art Institute of Chicago*

Making Distinctions: Interpreting the Notion of Sameness

1:30 P.M. - 2:05 P.M.

Alissa Crans, *Loyola Marymount University*

Social Choice and Functoriality

2:15 P.M. - 2:50 P.M.

Sarah Yeakel, *University of Maryland*

Unifying Different Worlds in Mathematics

3:00 P.M. - 3:35 P.M.

Angélica Osorno, *Reed College*

From Arithmetic to Category Theory

3:45 P.M. - 4:20 P.M.

Emily Riehl, *Johns Hopkins University*

INVITED PAPER SESSION

Strategies to Synergize Culture in the Learning and Doing of Mathematics

1:30 P.M. - 3:20 P.M., PLAZA BALLROOM E, PLAZA BUILDING

How do we embed various cultures into the learning and doing of mathematics? What are the ways that we can enhance the learning of mathematics through culturally-responsive teaching? Mathematics grounded in the African American, Latinx, and Native American traditions as well as other international traditions can stimulate connections and a sense of belonging in the mathematical community. Presenters will provide implementable strategies to synergize culture in the learning and the doing of

mathematics. By infusing various cultures into our mathematics, we enhance the learning experience as well as broaden the inclusion of those doing mathematics.

Organizer:

Talitha Washington, *Howard University and the National Science Foundation*

Importance of Culture in Indigenous Learning of Mathematics

1:30 P.M. - 1:50 P.M.

Bob Megginson, *University of Michigan*

Using Computer Modeling to Integrate Culture & Mathematics

2:00 P.M. - 2:20 P.M.

Jacqueline Leonard

Diary of a Black Mathematician: From Research I to Liberal Arts

2:30 P.M. - 2:50 P.M.

Edray Goins, *Pomona College*

Rehumanizing Mathematics: Should That Be Our Goal?

3:00 P.M. - 3:20 P.M.

Rochelle Gutiérrez, *University of Illinois*

CONTRIBUTED PAPER SESSION

The Capstone Experience for Mathematics Majors

1:30 P.M. - 3:45 P.M., GOVERNOR'S SQUARE 16, PLAZA BUILDING

Capstone experiences vary from research, service, and artistic projects, to oral or written exams, to study abroad, internships, and more. Come and share your experiences and learn what others are doing with culminating experiences for Mathematics majors. We encourage the submission of scholarly work including but not limited to original research, innovative ideas, projects, curricular materials, assessment models, etc.

Organizers:

Jacci White, Monika Kiss, and Kevin Murphy, *Saint Leo University*

Contracts and Assessment of Senior Projects

1:30 P.M. - 1:45 P.M.

Jacci White, *Saint Leo University*

The Capstone Experience: An Individualized Approach

1:50 P.M. - 2:05 P.M.

Leslie Jones, *University of Tampa*

CHRONOLOGICAL SCHEDULE CONTINUED

Saturday, August 4 CONTINUED

Ten years of Math Capstone “for all” at the Air Force Academy

2:10 P.M. - 2:25 P.M.

Ian Pierce, *US Air Force Academy*

Beth Schaubroeck, *US Air Force Academy*

Is 2+1 Better than 3? Examining Morehead State’s Two-Semester Senior Capstone

2:30 P.M. - 2:45 P.M.

Doug Chatham, *Morehead State University*

The Long and Winding Research Project

2:50 P.M. - 3:05 P.M.

Michael Brilleslyper, *U. S. Air Force Academy*

Ethan Berkove, *Lafayette College*

Investigate, Review, and Present: A Capstone Experience

3:10 P.M. - 3:25 P.M.

Karen B. Stanish, *Keene State College*

Writing Someone Else’s Senior Exam

3:30 P.M. - 3:45 P.M.

Kevin Murphy, *Saint Leo University*

CONTRIBUTED PAPER SESSION

Mastery Grading, Part C

1:30 P.M. - 3:05 P.M., GOVERNOR’S SQUARE 11, PLAZA BUILDING

Organizers:

David Clark, *Grand Valley State University*

Robert Campbell, *College of Saint Benedict and Saint John’s University*

Jeb Collins, *University of Mary Washington*

Alyssa Hoofnagle, *Wittenberg University*

Mike Janssen, *Dordt College*

Austin Mohr, *Nebraska Wesleyan University*

Jessica OShaughnessy, *Shenandoah University*

Cassie Williams, *James Madison University*

Factors Affecting Student Participation in Voluntary Reassessments in SBG

1:30 P.M. - 1:45 P.M.

Drew Lewis, *University of South Alabama*

Tools to Facilitate Mastery Grading

1:50 P.M. - 2:05 P.M.

Steven Clontz, *University of South Alabama*

Alternative Assessment Methods: Five Years In

2:10 P.M. - 2:25 P.M.

Joshua Bowman, *Pepperdine University*

Do Students Get It? SBG Implementation at Three Levels of the Curriculum

2:30 P.M. - 2:45 P.M.

Rebecca E. Gasper, *Creighton University*

Preparing Introductory Math Students For What Comes Next: Using High Stakes Quizzes Early (And Often)

2:50 P.M. - 3:05 P.M.

John Prather, *Ohio University*

CONTRIBUTED PAPER SESSION

Mathematics and the Life Sciences: Initiatives, Programs, Curricula

1:30 P.M. - 3:25 P.M., GOVERNOR’S SQUARE 17, PLAZA BUILDING

The 2015 CUPM Curriculum Guide to Majors in the Mathematical Sciences identified the life sciences as a key path through the mathematics major to graduate programs and the workforce.

Topics include scholarly contributions addressing initiatives, programs, curricula, and course materials at the interface of mathematics and the life sciences that have been implemented and tested at institutions of higher education.

Organizers:

Tim Comar, *Benedictine University*

Raina Robeva, *Sweet Briar College*

Sponsor: *The SIGMAA on Mathematical and Computational Biology (BIO SIGMAA)*

Quantitative Biology: An Alternative to Calculus for Biology Majors

1:30 P.M. - 1:45 P.M.

Margaret Rahmoeller, *Roanoke College*

First-year Calculus Workshops using Biology Lab Data

1:50 P.M. - 2:05 P.M.

Harry F. Hoke, *University of Richmond*

Kathy W. Hoke, *University of Richmond*

Reports on the Attitudes of Students in Calculus of Life Science toward Mathematics in Their Careers

2:10 P.M. - 2:25 P.M.

Yanping Ma, *Loyola Marymount University*

A Pathway from Introductory Material to Undergraduate Research in Mathematical Biology

2:30 P.M. - 2:45 P.M.

Timothy D. Comar, *Benedictine University*

CHRONOLOGICAL SCHEDULE

Saturday, August 4 CONTINUED

Incorporating Biology Topics into Mathematics Undergraduate Experiences

2:50 P.M. - 3:05 P.M.

Therese Shelton, *Southwestern University*
Emma K. Groves, *North Carolina State University*

Mathematical Analysis of Oscillatory Network of Transcriptional Regulators as a Course Project

3:10 P.M. - 3:25 P.M.

Kseniya Fuhrman, *Milwaukee School of Engineering*

CONTRIBUTED PAPER SESSION

Teaching Undergraduate Mathematics with Primary Historical Sources, Part B

1:30 P.M. - 4:05 P.M., GOVERNOR'S SQUARE 12, PLAZA BUILDING

Organizers:

Dominic Klyve, *Central Washington University*
Maria Zack, *Point Loma Nazarene University*
Jeff Suzuki, *Brooklyn College*

An Activity on Letter Correspondence in the History of Mathematics

1:30 P.M. - 1:45 P.M.

Matthew Haines, *Augsburg University*

Developing a Growth Mindset using TRIUMPHS PSPs

1:50 P.M. - 2:05 P.M.

Edward Bonan-Hamada, *Colorado Mesa University*

Beyond Just Doing the Math: An Investigation of the Role of Primary Source Projects in Supporting Student Learning of the Meta-Discursive Rules of Mathematics

2:10 P.M. - 2:25 P.M.

Janet Heine Barnett, *Colorado State University - Pueblo*
Cihan Can, *Florida State University*
Kathleen Clark, *Florida State University*

Implementing Primary Source Projects Using Overleaf, a Latex Platform in the Cloud

2:30 P.M. - 2:45 P.M.

Kenneth M. Monks, *Front Range Community College - Boulder County Campus*

Bridging the Sciences and the Humanities with Primary Historical Sources

2:50 P.M. - 3:05 P.M.

Abe Edwards, *Michigan State University*

Supplementing the History of Mathematics with Original Sources

3:10 P.M. - 3:25 P.M.

Dan Kemp, *South Dakota State University*

Learning Mathematics through Historical Projects

3:30 P.M. - 3:45 P.M.

Qin Yang, *MSU Denver*

The Radius of Curvature According to Christiaan Huygens

3:50 P.M. - 4:05 P.M.

Jerry M. Lodder, *New Mexico State University*

TOWN HALL SESSION

Quantitative Literacy Swap Session

1:30 P.M. - 2:50 P.M., PLAZA BALLROOM F, PLAZA BUILDING

In this swap session, participants will have the opportunity to share or borrow course materials related to quantitative literacy. We interpret course materials to include data sets, technology, individual lessons, case studies, entire courses, etc. At the beginning of the session, participants will sign up to give a brief (5 minutes or less) presentation of their resource. Come to share, come to receive, or come for both!

Organizers:

Victor Piercey, *Ferris State University*
Catherine Crockett, *Point Loma Nazarene University*
Andrew Miller, *Belmont University*
Gizem Karaali, *Pomona College*
Luke Tunstall, *Michigan State University*

Sponsor: *The SIGMAA on Quantitative Literacy (SIGMAA QL)*

MINICOURSE

Minicourse 2. Introduction to Inquiry-Based Learning, Part B

1:30 P.M. - 3:30 P.M., TOWER COURT A, TOWER BUILDING

Brian P Katz, *Augustana College*
Victor Piercey, *Ferris State University*
Eric Kahn, *Bloomsburg University*
Candice Price, *University of San Diego*
Xiao Xiao, *Utica College*
Alison Marr, *Southwestern University*

Sponsor: *The SIGMAA for Inquiry-Based Learning (IBL SIGMAA)*

CHRONOLOGICAL SCHEDULE CONTINUED

Saturday, August 4 CONTINUED

MINICOURSE

Minicourse 5. Mathematical Card Magic, Part B

1:30 P.M. – 3:30 P.M., TOWER COURT B, TOWER BUILDING

Colm Mulcahy, *Spelman College*

OTHER MATHEMATICAL SESSION

Special Interactive Presentation for High School Students, Parents, and Teachers

FREAKY FIXED POINTS

1:30 P.M. – 2:20 P.M., MAJESTIC BALLROOM, TOWER BUILDING

If you open up a map of the US while standing in the US, might there be a point on the paper sitting precisely at the location it represents? If you stir your (mathematically ideal) cup of coffee in the morning, does every point of liquid change location? If you crumple a piece of paper, does every point on it move?

Let's play games with triangles to discover the freaky existence of fixed points!

Leader:

James Tanton, *Mathematical Association of America*

Organizer:

Elgin Johnston, *Iowa State University*

Sponsor: MAA Council on Outreach

OTHER MATHEMATICAL SESSION

Creating New Mathematical Futures: A Study of Gender Equity in Mathematics Competitions

1:30 P.M. - 2:20 P.M., GRAND BALLROOM I, TOWER BUILDING

MCM/ICM is an alternative to traditional mathematics competitions and has achieved very different results, with an impressive 42% of participants being women. This progress toward gender equity prompted a research study examining the features of the environment that contribute to the participation of women. Researchers highlight the opportunities that MCM/ICM affords women to experience mathematics in different and powerful ways.

Organizers:

Jo Boaler, *Stanford University*

Sol Garfunkel, *Consortium for Mathematics and Its Applications (COMAP)*

SESSION FOR UNDERGRADUATE STUDENTS

Student Problem Solving Competition

1:30 P.M. – 3:00 P.M., GRAND BALLROOM II, TOWER BUILDING

This event is the finals of the Problem Solving Competition. Universities and colleges that participate monthly on their own campuses by holding problem solving contests are invited to send a contestant. Each contestant will be required to solve a series of mathematical problems. Based on the outcome, a champion along with 2nd through 6th place winners will be named.

Organizer:

Richard Neal, *American Society for the Communication of Mathematics*

OTHER MATHEMATICAL SESSION

MATH Rumble

2:30 P.M. – 4:00 P.M., MAJESTIC BALLROOM, TOWER BUILDING

The Math Rumble involves teachers in a Mathematical Creativity Contest including mathematical and pedagogical questions. The intention of the Math Rumble demonstration at Math Fest is to share a fun mathematical contest format with those who lead Math Teachers' Circles and similar activities.

Organizers:

Ed Keppelmann, *University of Nevada Reno*

Phil Yasskin, *Texas A&M University*

Paul Zeitz, *University of San Francisco*

Sponsor: The SIGMAA for Math Circles for Students and Teachers (SIGMAA-MCST)

TOWN HALL SESSION

Shaping and Fostering an Equitable Community in our Departments

SATURDAY, AUGUST 4, 3:00 P.M. – 4:20 P.M., PLAZA BALLROOM F, PLAZA BUILDING

The goal of this session is to compile a list of best practices for creating and sustaining an equitable department community. Small groups of participants, each led by a moderator, will brainstorm creative solutions to address a variety of questions and concerns regarding department habits and in all types of departments. The outcomes of the Town Hall will be published in the AWM Newsletter, MAA Focus, and the Notices.

Organizers:

Alejandra Alvarado, *Eastern Illinois University*

Candice Price, *University of San Diego*

Alissa Crans, *Loyola Marymount University*

Jackie Jensen-Vallin, *Lamar University*

CHRONOLOGICAL SCHEDULE

Saturday, August 4 CONTINUED

MINICOURSE

Minicourse 3. An Introduction to WeBWork: An Open Source Alternative for Generating and Delivering Online Homework Problems, Part B

4:00 P.M. – 6:00 P.M., TOWER COURT A, TOWER BUILDING

John Travis, *Mississippi College*

Robin Cruz, *College of Idaho*

Tim Flowers, *Indiana University of Pennsylvania*

Sponsor: *MAA Committee on Technology in Mathematics Education (CTiME)*

MINICOURSE

Minicourse 4. Leading a Successful Program Review, Part B

4:00 P.M. – 6:00 P.M., TOWER COURT B, TOWER BUILDING

Rick Gillman, *Valparaiso University*

Henry Walker, *Grinnell College*




Sponsor: *MAA Committee on Departmental Reviews*

We find connections in the world's data.

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Real innovation challenges the status quo.

In a triumph of the scientific method over superstition, Sabermetrics and similar techniques revolutionized baseball by applying a quantitative, statistical approach to improving teams' performance.

This pattern is a visualization of the win-loss percentage of all 32 major league baseball teams over their payroll from 2000 to 2014. The largest waveform belongs to the Oakland Athletics – a pioneer in applied statistical analysis.

EXHIBITORS

EXHIBITORS	BOOTH
AMATYC	307
American Institute of Mathematics	212
American Mathematical Society	101-109
Approval Voting USA	314
Association for Women in Mathematics	210
Budapest Semesters in Mathematics Education	214
Cabrilog	415
Cambridge University Press	315
CASIO AMERICA, INC.	106
Center of Math	401
Central Intelligence Agency	304
Cincinnati USA Convention & Visitors Bureau	205
Cubes and Things	312
Derivita	104
Digital Ed	206
Gradarius	204
Hawkes Learning	100-102
Imathgination LLC	303
Intech Investment Management	203
Kadon Enterprises, Inc.	403
Lyryx Learning Inc.	202
Math in Moscow	306
National Association of Math Circles	213
National Science Foundation	302
National Security Agency	300
Overleaf	211
Pearson	301
Princeton University Press	201
SageMath (University of Washington Math Dept)	311
SIGMAA - MCST	215
Springer	200
Tangential Projects LLC	313
Taylor & Francis Group	310
The Initiative for Mathematics Learning by Inquiry (MLI)	207
Woodrow Wilson Academy of Teaching and Learning- WW Foundation	305
Zim Olson and Zim Mathematics	405

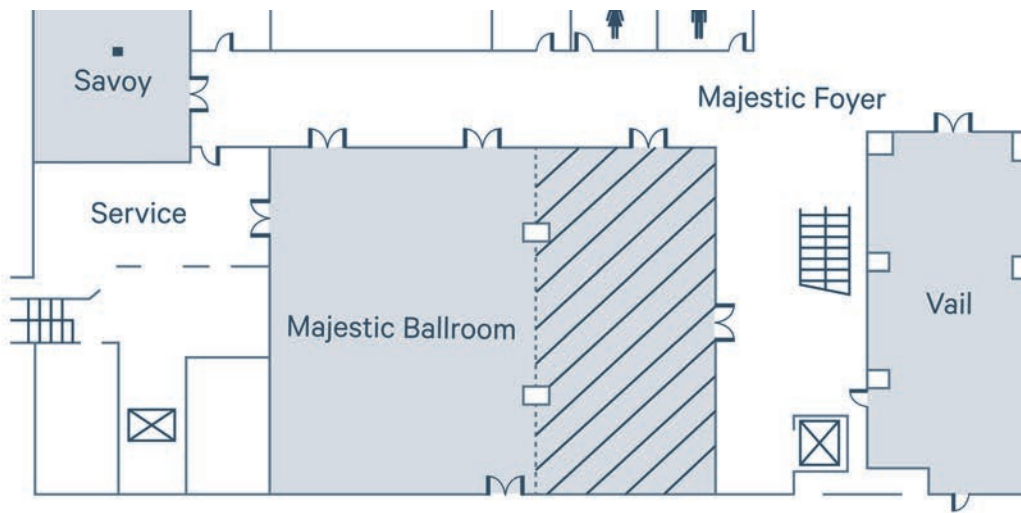
MATLAB SPEAKS DEEP LEARNING

With just a few lines of MATLAB® code, you can use CNNs and training datasets to create models, visualize layers, train on GPUs, and deploy to production systems.

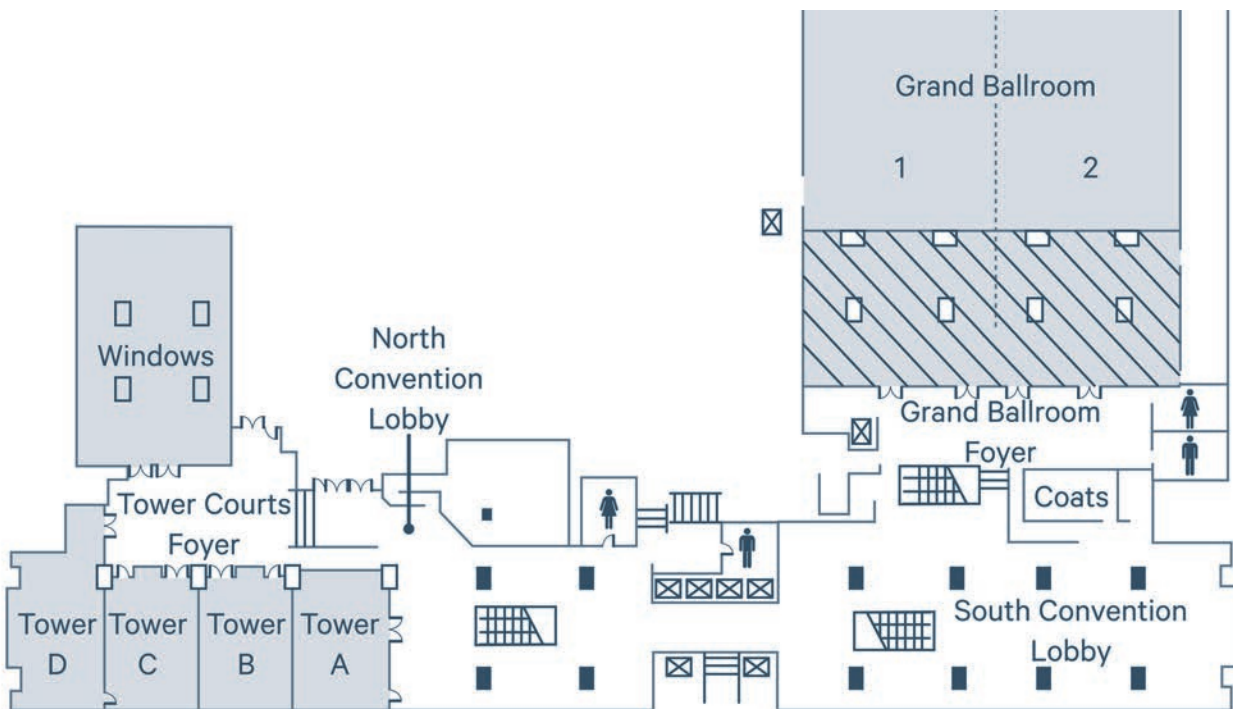
mathworks.com/deeplearning



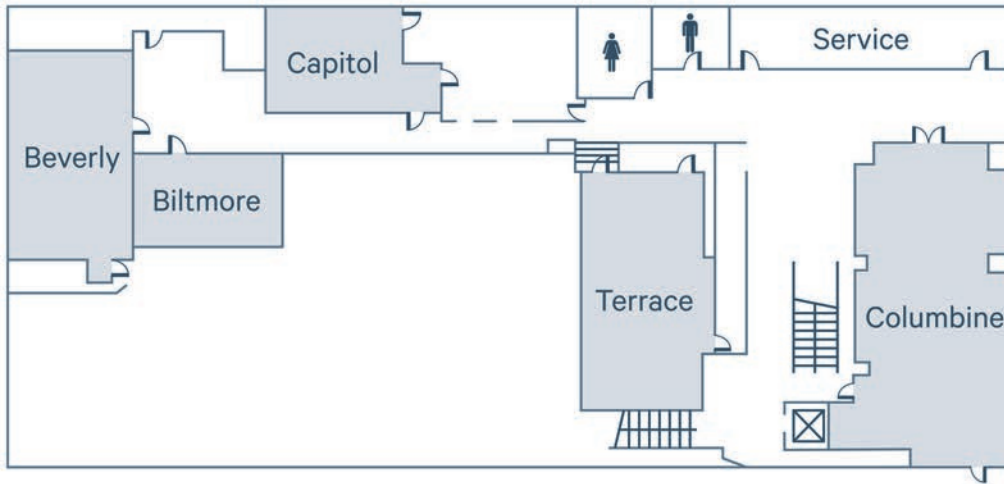
SHERATON DENVER DOWNTOWN HOTEL, MAJESTIC LEVEL, TOWER BUILDING



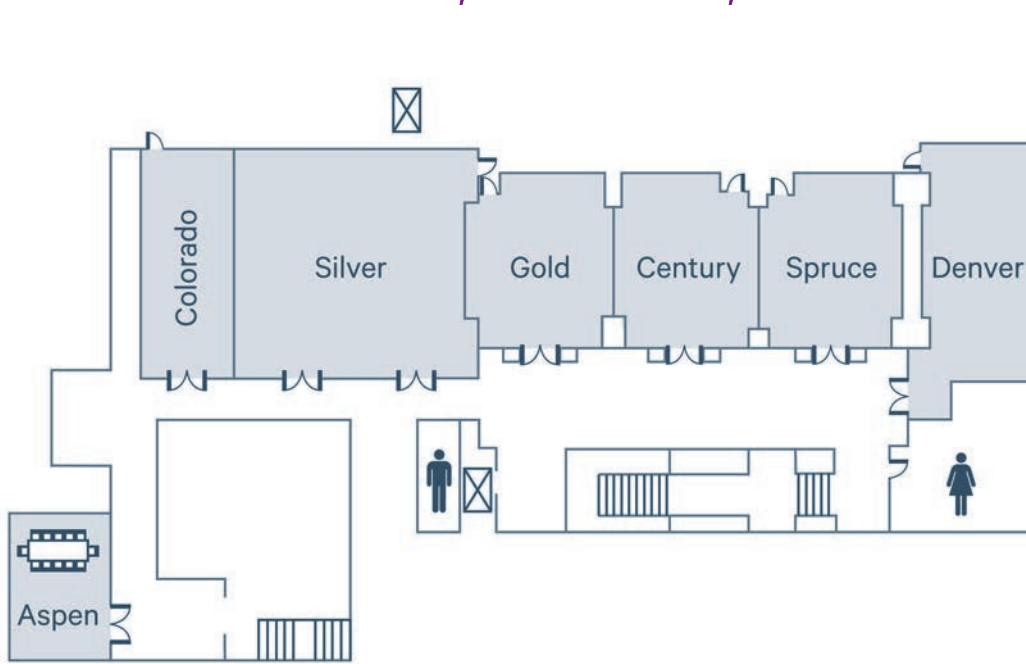
SHERATON DENVER DOWNTOWN HOTEL, SECOND LEVEL, TOWER BUILDING



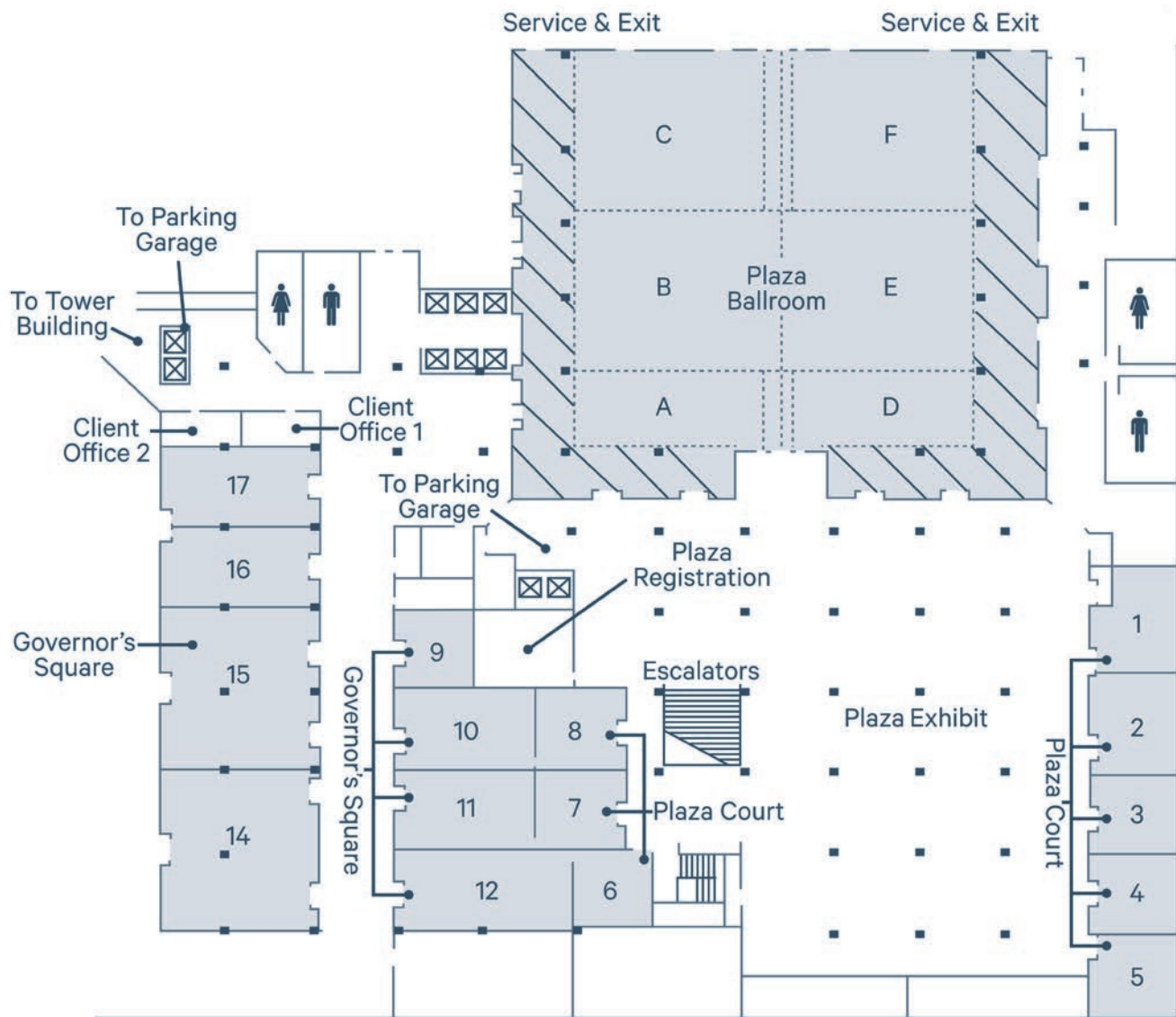
SHERATON DENVER DOWNTOWN HOTEL, TERRACE LEVEL, TOWER BUILDING



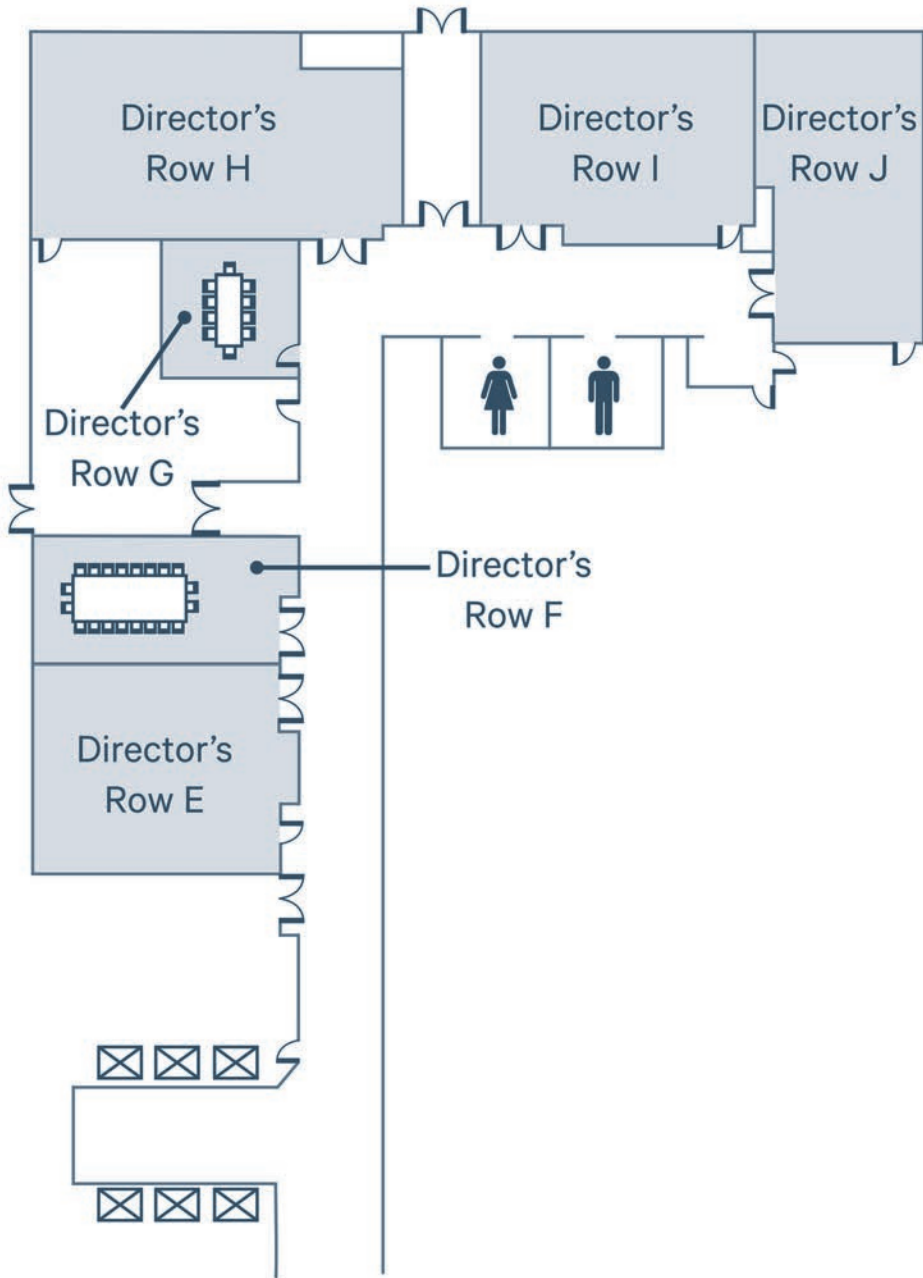
SHERATON DENVER DOWNTOWN HOTEL, MEZZANINE LEVEL, TOWER BUILDING



SHERATON DENVER DOWNTOWN HOTEL, CONCOURSE LEVEL, PLAZA BUILDING

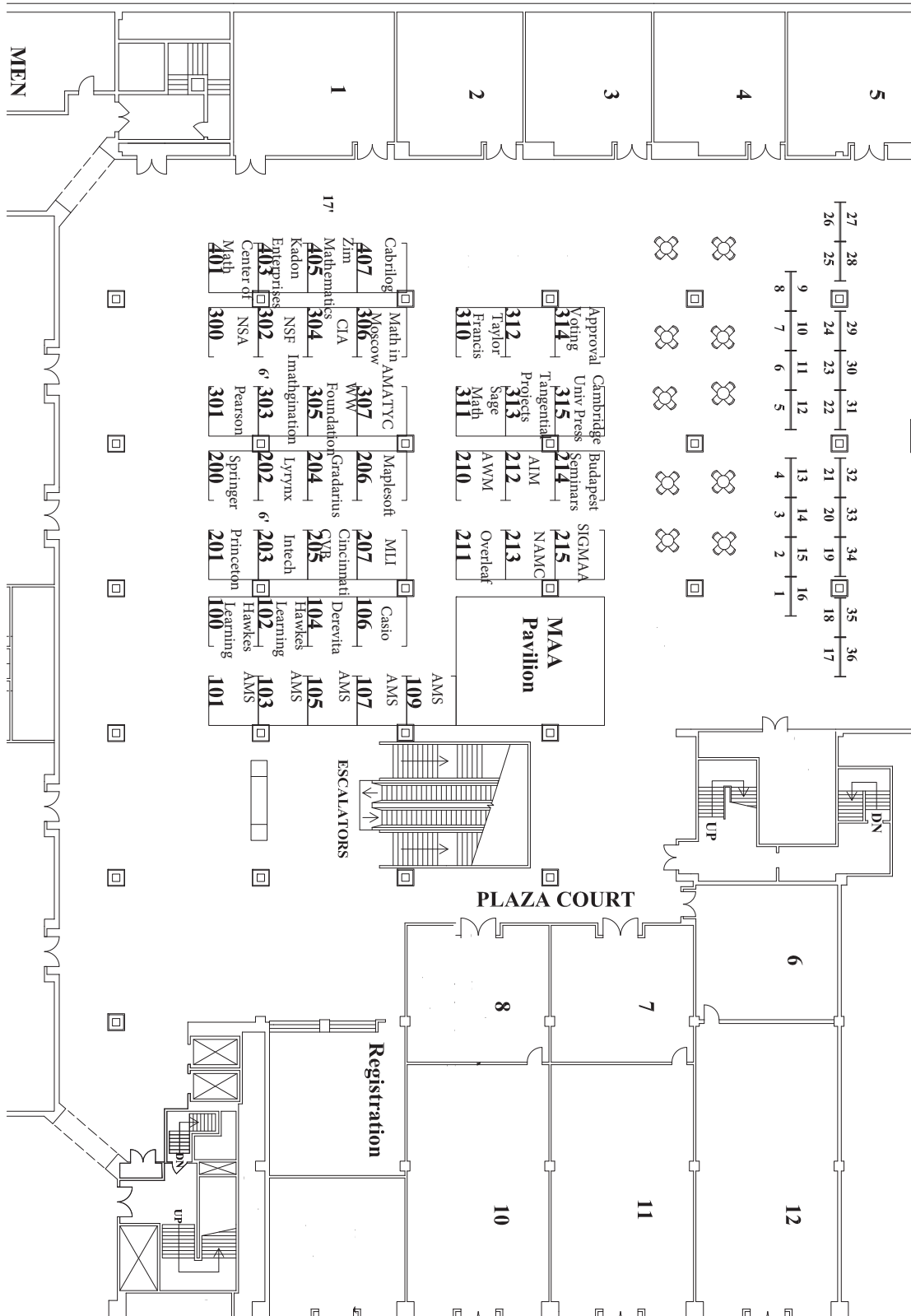


SHERATON DENVER DOWNTOWN HOTEL, LOBBY LEVEL, PLAZA BUILDING



MAA EXHIBIT HALL, PLAZA EXHIBITS

PLAZA COURT



Schedule At A Glance

Wednesday, August 1

Sheraton Downtown Denver Hotel	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
Plaza Exhibit Plaza Building Concourse Level											Exhibit Hall & Grand Opening Reception 6:00 PM-8:00 PM		
Plaza Registration Plaza Building Concourse Level								Registration 3:00 PM-8:00 PM					
Plaza Ballroom A, B, & C Plaza Building Concourse Level													Pi Mu Epsilon J. Sutherland Frame Lecture 8:00 PM-8:50 PM
Plaza Ballroom E Plaza Building Concourse Level										Math Jeopardy 5:30 PM-6:15 PM			
Governors Square 15 Plaza Building: Concourse Level						Data Science and the Mathematics Department 1:00 PM- 5:00 PM							
Windows Tower Building: Second Level									PME Student Reception 4:15 PM-5:15 PM				
Denver Tower Building: Mezzanine Level	MAA Congress Meeting 8:30 AM- 5:00 PM												

Schedule At A Glance

Thursday, August 2

Sheraton Downtown Denver Hotel	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	
Plaza Exhibit Plaza Building Concourse Level		Exhibit Hall 9:00 AM-5:00 PM						General Contributed Poster Session I 1:30 PM- 3:00 PM	General Contributed Poster Session II 3:30 PM- 5:00 PM					
Plaza Registration Plaza Building Concourse Level	Registration 8:00 AM-7:00 PM													
Plaza Ballroom A, B, & C Plaza Building Concourse Level		MAA Invited Address (de Pillis) 9:00 AM-9:50 AM	Joint Invited Address (Petters) 10:00 AM-10:50 AM	Earle Raymond Hedrick Lecture 1 (Staffilani) 11:00 AM-11:50 AM			Lecture for Students (Taalman) 1:30 PM-2:20 PM		Section Officers Meeting 3:00 PM-5:00 PM					
Plaza Ballroom D Plaza Building Concourse Level							TCPS: Research in Undergraduate Mathematics Education 1:30 PM- 4:45PM							
Plaza Ballroom E Plaza Building Concourse Level								IPS: The MAA Instructional Practices Guide in Action 3:00 PM- 5:00 PM						
Plaza Ballroom F Plaza Building Concourse Level							Panel- Advocating for Your Career and Yourself 1:30 PM- 2:50 PM	Town Hall- Mathematical Mamas – Being Both Beautifully 3:00 PM-4:20 PM	Panel- How to Apply for Jobs in Academia and Industry after Your PhD 4:30 PM- 5:50 PM					
Plaza Court 1 Plaza Building Concourse Level		MAA SPS #1 9:00 AM- 10:55 AM						MAA SPS #5 2:30 PM- 4:25 PM	MAA SPS #9 4:30 PM- 6:05 PM					
Plaza Court 2 Plaza Building Concourse Level		MAA SPS #2 9:00 AM- 10:55 AM						MAA SPS #6 2:30 PM- 4:25 PM	MAA SPS #10 4:30 PM- 6:05 PM					
Plaza Court 3 Plaza Building Concourse Level		MAA SPS #3 9:00 AM- 10:55 AM						MAA SPS #7 2:30 PM- 4:25 PM	MAA SPS #11 4:30 PM- 6:05 PM					
Plaza Court 4 Plaza Building Concourse Level		MAA SPS #4 9:00 AM- 10:55 AM						MAA SPS #8 2:30 PM- 4:25 PM	MAA SPS #12 4:30 PM- 6:05 PM					
Plaza Court 5 Plaza Building Concourse Level		PME SPS #1 9:00 AM- 10:55 AM						PME SPS #4 2:30 PM- 4:25 PM	PME SPS #7 4:30 PM- 6:25 PM					
Plaza Court 6 Plaza Building Concourse Level		PME SPS #2 9:00 AM- 10:55 AM						PME SPS #5 2:30 PM- 4:25 PM	PME SPS #8 4:30 PM- 6:25 PM					
Plaza Court 7 Plaza Building Concourse Level		PME SPS #3 9:00 AM- 10:55 AM						PME SPS #6 2:30 PM- 4:25 PM	PME SPS #9 4:30 PM- 6:25 PM					
Governor's Square 10, Plaza Building: Concourse Level							TCPS: A Number is Never an Answer: Developing Mathematical Thinking and Communication Through Writing 1:30 PM- 5:45 PM							
Governor's Square 11, Plaza Building: Concourse Level							TCPS: Mastery Grading Part A 1:30 PM- 4:25 PM							
Governor's Square 12, Plaza Building: Concourse Level		TCPS: Encouraging Effective Teaching Innovation Part A 9:00 AM- 11:55 AM					TCPS: Encouraging Effective Teaching Innovation Part B 1:30 PM- 6:05 PM							
Governor's Square 14, Plaza Building: Concourse Level							TCPS: Advancing Women in Mathematics: On the Ground Initiatives 1:30 PM- 5:25 PM							
Governor's Square 15, Plaza Building: Concourse Level							TCPS: Great Circles, Great Problems 1:30 PM- 5:05 PM		SIGMAA MCST Business Meeting 5:05 PM-5:55 PM					
Governor's Square 16, Plaza Building: Concourse Level							TCPS: Mathematical Themes in a First-Year Seminar 1:30 PM- 5:05 PM			SIGMAA QL Business Meeting 6:00 PM- 7:00 PM				
Governor's Square 17, Plaza Building: Concourse Level							TCPS: Mathematics Research Experiences for K-12 Teachers and Students 1:30 PM-3:45 PM							
Tower Court A Tower Building: Second Level							Minicourse 1A: Initiating, Designing, Building, and Using Modeling Scenarios for Teaching Differential Equations 1:30 PM- 3:30 PM		Minicourse 2A: Introduction to Inquiry-Based Learning 4:00 PM- 6:00 PM					
Tower Court B Tower Building: Second Level							Minicourse 6A: Visualizing Projective Geometry Through Photographs and Perspective Drawings 1:30 PM- 3:30 PM		Minicourse 5A: Mathematical Card Magic 4:00 PM- 6:00 PM					
Tower Court D Tower Building: Second Level							Workshop- What's the Story? Research Presentations for an Undergraduate Audience 1:30 PM- 2:50 PM	Speed Interviewing Marathon for Students 3:00 PM- 4:20 PM	Workshop- An Introduction to Team-Based Learning 4:30 PM- 5:50 PM					
Windows Tower Building: Second Level											Graduate Student Reception 6:00 PM-7:00 PM			
Grand Ballroom I Tower Building: Second Level												President's Membership Jubilee 7:00 PM-8:30 PM		
Grand Ballroom II Tower Building: Second Level							IPS- Bridging Network Science and Graph Theory 1:30 PM- 4:20 PM		Estimation! 4:30 PM-6:15 PM					

Sheraton Downtown Denver Hotel	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	
Plaza Exhibit Plaza Building Concourse Level		Exhibit Hall 9:00 AM-5:00 PM							General Contributed Poster Session III 1:00 PM- 2:30 PM		PosterFest 3:00 PM- 4:30 PM			
Plaza Registration Plaza Building Concourse Level	Registration 8:00 AM-6:00 PM													
Plaza Ballroom A, B, & C Plaza Building Concourse Level	MAA Prize Session 8:30 AM-9:10 AM	AWM-MAA Etta Zuber Falconer Lecture (Gorkin) 9:30 AM-10:20 AM	Earle Raymond Hedrick Lecture 2 (Staffilani) 10:30 AM-11:20 AM	MAA Invited Address (Cheng) 11:30 AM-12:30 PM		NAM David Harold Blackwell Lecture (Higgins) 1:30 PM-2:20 PM	Alder Award Session 2:30 PM-3:20 PM							
Plaza Ballroom D Plaza Building Concourse Level						AWM IPS- Geometric Ideas and Where to Find Them 1:30 PM- 4:20 PM								
Plaza Ballroom E Plaza Building Concourse Level						IPS- Modeling Biological Rhythms 1:30- 4:50 PM								
Plaza Ballroom F Plaza Building Concourse Level						Panel- Best Practices for Teaching Mathematics Online 1:30 PM-2:50 PM	Panel- Nonacademic Career Paths for Undergraduate Mathematics Majors 3:00 PM-4:20 PM	Panel- Using Your MAA Departmental Membership 4:30 PM- 5:50 PM				Uniform Convergence (Play) 8:00 PM-9:30 PM		
Plaza Court 1 Plaza Building Concourse Level		MAA SPS #13 9:30 AM- 12:05 PM				MAA SPS #17 2:30 PM- 4:05 PM								
Plaza Court 2 Plaza Building Concourse Level		MAA SPS #14 9:30 AM- 12:05 PM				MAA SPS #18 2:30 PM- 4:25 PM								
Plaza Court 3 Plaza Building Concourse Level		MAA SPS #15 9:30 AM- 12:05 PM				MAA SPS #19 2:30 PM- 4:25 PM								
Plaza Court 4 Plaza Building Concourse Level		MAA SPS #16 9:30 AM- 12:05 PM				MAA SPS #20 2:30 PM- 4:25 PM								
Plaza Court 5 Plaza Building Concourse Level		PME SPS #10 9:30 AM- 12:25 PM												
Plaza Court 6 Plaza Building Concourse Level		PME SPS #11 9:30 AM- 12:25 PM												
Governor's Square 10, Plaza Building: Concourse Level		TCPS: A Number is Never an Answer: Developing Mathematical Thinking and Communication Through Writing 9:00 AM- 12:15 PM				TCPS: Best Practices and Innovation in the Teaching of Discrete Mathematics 1:30 PM-4:45 PM					WEB SIGMAA Business Meeting 6:00 PM- 7:30 PM			
Governor's Square 11, Plaza Building: Concourse Level						TCPS: Mastery Grading Part B 1:30 PM- 5:05 PM								
Governor's Square 12, Plaza Building: Concourse Level						TCPS: Teaching Undergraduate Mathematics with Primary Historical Sources Part A 1:30 PM- 4:45 PM								
Governor's Square 14, Plaza Building: Concourse Level		TCPS: Inquiry-Based Learning and Teaching, Part A 9:30 AM- 12:15 PM				TCPS: Inquiry-Based Learning and Teaching, Part B 1:30 PM- 5:45 PM								
Governor's Square 15, Plaza Building: Concourse Level						TCPS: Fostering Undergraduate Interdisciplinarity 1:30 PM- 6:25 PM								
Governor's Square 16, Plaza Building: Concourse Level		TCPS: Priming the Calculus Pump: Fresh Approaches to Teaching First-Year Calculus, Part A 9:30 AM- 12:25 PM				TCPS: Priming the Calculus Pump: Fresh Approaches to Teaching First-Year Calculus, Part B 1:30 PM- 5:25 PM								
Governor's Square 17, Plaza Building: Concourse Level						TCPS: Ready or Not: Corequisite Courses and Just-in-Time Review 1:30 PM- 5:05 PM								
Tower Court A Tower Building: Second Level						Minicourse 1B Initiating, Designing, Building, and Using Modeling Scenarios for Teaching Differential Equations 1:30 PM-3:30 PM		Minicourse 3A: An Introduction to WebWork: An Open Source Alternative for Generating and Delivering Online Homework Problems 4:00 PM- 6:00 PM						
Tower Court B Tower Building: Second Level						Minicourse 6B Visualizing Projective Geometry Through Photographs and Perspective Drawings 1:30 PM-3:30 PM		Minicourse 4A: Leading a Successful Program Review 4:00 PM- 6:00 PM						
Tower Court D Tower Building: Second Level						Workshop- Meeting the Challenge of Introducing Senior High School Students to Contemporary Mathematics 1:30 PM-2:50 PM		Workshop- Mathematical Puzzle Programs: Outreach and Recruitment with Puzzles 3:10 PM- 4:30 PM						
Grand Ballroom I Tower Building: Second Level						The Case of the Missing Vertex 1:30 PM-2:20 PM					PME Banquet 6:00 PM-7:45 PM			
Grand Ballroom II Tower Building: Second Level			TCPS: Recreational Math: Puzzles, Card Tricks, Games, Gambling & Sports, Part A 10:30 AM- 12:25 PM			TCPS: Recreational Math: Puzzles, Card Tricks, Games, Gambling & Sports, Part B 1:30 PM- 5:15 PM					IBL SIGMAA Business Meeting & Guest Lecture 6:00 PM-8:00 PM			

Sheraton Downtown Denver Hotel	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
Plaza Exhibit Plaza Building Concourse Level		Exhibit Hall 9:00 AM-12:30 PM											
Plaza Registration Plaza Building Concourse Level	Registration 8:00 AM-3:00 PM												
Plaza Ballroom A, B, & C Plaza Building Concourse Level		James R. C. Leitzel Lecture (Washington) 9:00 AM-9:50 AM	Earle Raymond Hedrick Lecture 3 (Staffilani) 10:00 AM-10:50 AM	MAA Invited Address (Teran) 11:00 AM-11:50 AM									
Plaza Ballroom D Plaza Building Concourse Level						MAA Business Meeting 1:00 PM-1:20 PM	IPS- Category Theory for All 1:30 PM-4:20 PM						
Plaza Ballroom E Plaza Building Concourse Level							IPS- Strategies to Synergize Culture in the Learning and Doing of Mathematics 1:30 PM-3:20 PM						
Plaza Ballroom F Plaza Building Concourse Level							Town Hall- Quantitative Literacy Swap Session 1:30 PM-2:50 PM		Town Hall- Shaping and Fostering an Equitable Community in our Departments 3:00 PM-4:20 PM				
Governor's Square 9, Plaza Building: Concourse Level							Great Talks for a General Audience 1:00 PM- 5:00 PM						
Governor's Square 10, Plaza Building: Concourse Level							Great Talks for a General Audience 1:00 PM- 5:00 PM						
Governor's Square 11, Plaza Building: Concourse Level							TCPS: Mastery Grading, Part C 1:30 PM- 3:05 PM						
Governor's Square 12, Plaza Building: Concourse Level							TCPS: Teaching Undergraduate Mathematics with Primary Historical Sources, Part B 1:30 PM- 5:30 PM						
Governor's Square 14, Plaza Building: Concourse Level		TCPS: Inquiry-Based Learning and Teaching, Part C 9:00 AM- 12:15 PM					Great Talks for a General Audience 1:00 PM- 5:00 PM						
Governor's Square 15, Plaza Building: Concourse Level							TCPS: Modeling-Based Teaching and Learning in Differential Equations Courses 1:00 PM- 4:55 PM						
Governor's Square 16, Plaza Building: Concourse Level		TCPS: Priming the Calculus Pump: Fresh Approaches to Teaching First-Year Calculus, Part C 9:00 AM- 11:35 AM					TCPS: The Capstone Experience for Mathematics Majors 1:30 PM- 3:45 PM						
Governor's Square 17, Plaza Building: Concourse Level							TCPS: Mathematics and the Life Sciences: Initiatives, Programs, Curricula 1:30 PM- 3:25 PM						
Majestic Ballroom Tower Building: Majestic Level			Math Teacher's Circle Demonstration 10:00 AM-11:30 AM				Presentation for High School Students 1:30 PM- 2:20 PM	Math Rumble 2:30 PM- 4:00 PM					
Tower Court A Tower Building: Second Level							Minicourse 2B: Introduction to Inquiry-Based Learning 1:30 PM- 3:30 PM			Minicourse 3B: An Introduction to WeBWork: An Open Source Alternative for Generating and Delivering Online Homework Problems 4:00 PM- 6:00 PM			
Tower Court B Tower Building: Second Level							Minicourse 5B: Mathematical Card Magic 1:30 PM- 3:30 PM			Minicourse 4B: Leading a Successful Program Review 4:00 PM- 6:00 PM			
Grand Ballroom I Tower Building: Second Level		MAA Mathematical Competition in Modeling (MCM) Winners 9:00 AM-10:15 AM					Creating New Mathematical Futures 1:30 PM-2:20 PM						
Grand Ballroom II Tower Building: Second Level		TCPS: Recreational Math: Puzzles, Card Tricks, Games, Gambling & Sports, Part C 9:00 AM- 11:25 AM					Student Problem Solving Competition 1:30 PM-3:00 PM						

* Please note information subject to change. Last updated 7/9/18

A series of horizontal dotted lines for taking notes.



MAA MATHFEST

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