Fall 2025 Meeting of MAA-NJ

Bloomfield College of Montclair State University

Saturday, October 25, 2025

Schedule

All events (except lunch) take place in College Hall

8:30 – 9:30	**Registration and Coffee**. Lobby
9:00 – 1:30	**Book Exhibits**. Lobby
9:30 – 9:40	**Welcome.** *Dr. Emily Rutter, Associate Dean for Academic Affairs.* Room 16
9:40 –10:30	**How Do Undergraduate Mathematics Students Approach Proof Structure?** *Dov Zazkis*. Room 16
10:30 –10:45	**MAA-NJ Business Meeting**. Room 16
10:45 –11:10	**Refreshments.** Lobby
11:10 –12:00	**Quads: A SET-like Game With a Twist**. *Lauren Rose*. Room 16
12:00 –1:00	**Lunch.** Westminster Hall **Lunch Discussion Tables**.
1:10 – 2:30	**Workshop: Incorporating Puzzles and Games into the Mathematics Classroom**. Led by *Lauren Rose*. Room COHL 102 **General Contributed Papers**: o **Session 1**. Room COHL 135 o **Session 2**. Room COHL 104
2:30 – 3:00	**Intermission and Refreshments**. Lobby (Silent auction bidding closes at 3:00.)
3:00 – 3:50	**Building a Unique Career Within and Outside of Mathematics.** *Brett Jefferson*. Room 16
3:50 – 4:30	**Prizes and Awards**. Door prizes and silent auction winners (must be present to win). Room 16
5:00	**Dinner Honoring Speakers**. Bloomfield Steak and Seafood House, 409 Franklin St, Bloomfield, NJ

Abstracts and Biographies of Speakers

How Do Undergraduate Mathematics Students Approach Proof Structure?

Dov Zazkis

Bloomfield College of Montclair State University

Abstract: This presentation explores a series of studies in mathematics education focused on students' conceptions of proof. Each study is grounded in a simple heuristic: giving students novel proof task types provides new insights into their understanding of proof. The findings reveal intriguing perspectives on how students conceptualize mathematical proofs, and how these conceptualizations influence their approach to reading and interpreting proofs authored by others.

Dov Zazkis is a faculty member at Bloomfield College of Montclair State University. His research interests lie primarily in the transition to proof at the undergraduate level and in mathematics teacher education. He is particularly interested in the reciprocal relationship between students' and teachers' argument comprehension processes and the strategies they use to formulate and construct arguments. Dr. Zazkis has received recognition for both his research and teaching, including a chapter reprinted in *The Best Writing on Mathematics* (2014) and the Charles Wexler Teaching Award (2021).

Quads: A SET-like Game With a Twist

Lauren Rose

Bard College

Abstract: Quads is a card game similar to SET, with 81 cards, each containing 1– 4 objects in one of 4 colors and one of 4 shapes. The goal of the game is to find "quads", which are sets of 4 cards that satisfy a particular pattern. We will explore several mathematical properties of this game, including the question of how many cards you must lay down to guarantee a quad.

Dr. Lauren Rose is a mathematics professor at Bard College. Her research areas include algebraic combinatorics, finite geometry, and recreational math. She enjoys mentoring students in both research and outreach, and is the inventor of several mathematical games. She has held leadership roles in the Math Circle and Undergraduate Research communities, is a member of the MoMath advisory council, and in 2022 was made a Fellow of the Association for Women in Mathematics. She is passionate about making deep mathematics fun and accessible to diverse populations.

Workshop

Incorporating Puzzles and Games into the Mathematics Classroom

Presenter: *Lauren Rose*

Description:

Puzzles and games offer engaging ways to explore mathematics, spark curiosity, and build inclusive, collaborative learning environments. In this hands-on workshop, participants will experience how playful exploration can deepen understanding and engage all learners. We'll begin by working as "students," then reflect and share ideas for classroom use. Activities will include the Rubik's Cube, EvenQuads, and puzzles from the Julia Robinson Math Festival. No prior experience with these puzzles or games is assumed.

Building a Unique Career Within and Outside of Mathematics

Brett Jefferson

Pacific Northwest National Laboratory

Abstract: As professional mathematicians, many of us envision and live out a career in academia that often is limited to teaching, varying degrees of research, and service to the university or college. This talk will introduce and discuss what a career at a national laboratory has been like for me. Namely, I'll touch on my experiences as 1. a researcher and principal investigator, 2. a staff professional with non-research-related expectations, and 3. an individual with interests in contributing to the growth of others and communities. I'll try to cover many facets of what a "year in the life" of a labbie is *actually* like.

Dr. Brett Jefferson is an interdisciplinary scientist at PNNL who routinely works in the areas of human factors modeling, topological data analysis, and machine learning. His research interests include discovering hidden patterns in difficult datasets (like that data pertaining to human cognition) and studying robustness properties related to those measures. Brett says that one of the reasons he came to work at PNNL was that he had the freedom to explore multidisciplinary areas of research in a collaborative environment. Brett served on the board of the National Association of Mathematicians and is a member of the Society for Mathematical Psychology. In his spare time, Brett enjoys playing boardgames and watching Marvel movies with his wife and their 2-year-old.

Contributed Paper Sessions

Organizer: Kathy Turrisi, Centenary University

Session 1: COHL 135

1:00–1:30: **Harnessing Generative AI in Mathematics Education**.
Ross Malaga, Montclair State University

1:37–1:57: **ChatGPT as a Teaching Assistant: Creating Test Banks for Math Courses.**
Grace Cook, Bloomfield College of Montclair State University

2:04–2:24: **Using AI Tools to Foster Metacognition in Calculus Courses.**
Sheila Tabanli, Rutgers University

Talk Abstracts

Session 1: COHL 135

1:10–1:30: Harnessing Generative AI in Mathematics Education.

Ross Malaga, Montclair State University

Abstract: As generative AI tools like ChatGPT, Claude, and CoPilot become increasingly capable, mathematics educators have an opportunity to enhance teaching, streamline content creation, and support student learning in new and meaningful ways. This talk introduces math professors to practical applications of generative AI tailored specifically for higher education. Participants will explore real-time use cases, including generating problem sets with solutions, drafting explanations at varying levels of difficulty, and designing interactive learning aids. Attendees will be guided through live demos and collaborative exercises, leaving with strategies they can immediately implement in their own courses. No prior experience with AI tools is required—just a willingness to experiment and engage. -- Generated by ChatGPT.

1:37–1:57: ChatGPT as a Teaching Assistant: Creating Test Banks for Math Courses.

Grace Cook, Bloomfield College of Montclair State University

Abstract: This session demonstrates how ChatGPT can be used to design, troubleshoot, and implement test banks for use in Canvas and other learning management systems. Attendees will see how ChatGPT can act as both a creative and technical partner — producing structured item banks, converting them into LMS-compatible formats, and assisting in debugging common errors such as answer mismatches or invalid XML. The session also highlights how these AI-assisted workflows can streamline quiz creation, reduce repetitive setup tasks, and support the use of biweekly, low-stakes check-ins that help students stay engaged and on track in mathematics courses.

2:04–2:24: Using AI Tools to Foster Metacognition in Calculus Courses.

Sheila Tabanli, Rutgers University

Abstract: The rapid development of artificial intelligence (AI) presents new opportunities for mathematics instruction, particularly in gateway courses such as calculus, where students often struggle with both conceptual understanding and problem-solving fluency. This talk explores how AI tools can be strategically integrated into the calculus classroom to enhance student learning while addressing common misconceptions and reducing cognitive load. I will share examples of classroom-tested applications, including AI-generated worked solutions, step-by-step feedback for problem-solving, and LaTeX coding for Gradescope integration. In addition, I will discuss how AI can be leveraged to foster metacognition and independent learning, aligning with evidence-based practices from mathematics education research. Emphasis will be placed on maintaining mathematical rigor and equity while using AI to enhance students' self-directed learning and mastery of calculus concepts.

Session 2: COHL 104

1:10–1:30: From the Basics to Biorthogonality in the Context of Digital Image Processing.
Yevgeniy (Eugene) Galperin, East Stroudsburg University

1:37–1:57: Physics and Math: An Interwoven Union.
Preethi Ganapathy, County College of Morris

2:04–2:24: Exploration of Patterns in a Special Coloring of Pascal Triangle.
Preston Pietruszewski, Montclair State University

Talk Abstracts

Session 2: COHL 104

1:10–1:30: From the Basics to Biorthogonality in the Context of Digital Image Processing.
Yevgeniy (Eugene) Galperin, East Stroudsburg University

Abstract: We introduce most of the standard concepts of linear algebra in the context of digital image processing. We guide the students to apply standard linear algebra techniques to image enhancement, image compression, and other image-processing problems. In the process, we cover such oft-overlooked topics as projective transforms and biorthogonal matrices and delve into the fields of Discrete Fourier Transforms and Discrete Wavelet Transforms.

1:37–1:57: Physics and Math: An Interwoven Union.
Preethi Ganapathy, County College of Morris

Abstract: Physics and mathematics share a profound and inseparable relationship—one that has continually shaped our understanding of the natural world. Mathematics provides the precise language through which physical laws are expressed, while physics grounds abstract mathematical structures in empirical reality. From Newton's formulation of classical mechanics using calculus to the use of differential geometry in Einstein's general relativity and the probabilistic frameworks underpinning quantum mechanics, the evolution of physics has been deeply dependent on mathematical innovation. Conversely, physical inquiry has often inspired new branches of mathematics, such as group theory and topology, by revealing the need for novel ways to describe symmetry, space, and dynamics. This presentation will briefly explore

the historical and conceptual interplay between these disciplines, highlighting key moments where their mutual dependence has advanced both theoretical understanding and technological progress. By examining contemporary examples—from quantum field theory to computational modeling—we aim to illustrate how the dialogue between physics and mathematics continues to shape the future of scientific discovery and education alike.

2:04–2:24: Exploration of Patterns in a Special Coloring of Pascal Triangle.

Preston Pietruszewski, Montclair State University

Abstract: In this research, we investigate a graph coloring problem related to the famous Pascal triangle, whose numbers are useful binomial coefficients. On the m row of the Pascal triangle, we modulo the integer part $[m/2]$ to obtain a row of binary numbers based on the divisibility. A new triangle of binary numbers is produced and is named the α-triangle. Two colors are assigned to the two numbers: 0 and 1. We explore various patterns of the coloring of the α-triangle such as single-color rows and diagonals, equally spaced single-color patterns and stems, etc. We produce a multitude of different theorems, proving these patterns using results ranging from number theory and combinatorics. Additionally, this research is presentable to those who do not study mathematics and to those who have not taken advanced courses. The results of this research reflect a beautiful combination of arts and mathematics.

Lunch Discussion Tables

Organizer: Kathy Turrisi, Centenary University

1. **Proof Education Curricula**, led by Dov Zazkis, Bloomfield College of Montclair State University
2. **VITAL Faculty Concerns**, led by Grace Cook, Bloomfield College of Montclair State University
3. **Creating Welcoming Communities and Supporting Students Post-Covid**, led by Lauren Rose, Bard College
4. **AI Tools and Accessibility Workflows**, led by Ross Malaga, Montclair State University, Sheila Tabanli, Rutgers University, and Kathy Turrisi, Centenary University
5. **Professional Priorities and Personal Values**, led by Brett Jefferson, Pacific Northwest National Laboratory

We look forward to a set of lively and interesting discussions!

Dinner Honoring the Invited Speakers

Following the meeting, we will honor the invited speakers at dinner at Bloomfield Steak and Seafood House, 409 Franklin St, Bloomfield, NJ. Everyone is cordially invited.

Book Sales at the Meeting

There will be display copies of MAA books at the meeting which may be ordered from the AMS at a 25% discount using a coupon code available at the meeting. You can order them by calling (800) 321-4267 or via the website: https://bookstore.ams.org

The discount will be available until December 1, 2025. There will also be display copies of books from Princeton University Press that may be ordered at a 30% conference discount using a coupon code available at the meeting. You can order them via the website: https://press.princeton.edu The discount will be available until November 30, 2025.

Acknowledgments

We thank the Bloomfield College of Montclair State University program area of Computational, Natural, and Applied Sciences for their kind hospitality in hosting the meeting.

We thank Princeton University Press for their generous donations for silent auction and door prizes.

Future Meetings

MAA-NJ: The Spring 2026 MAA-NJ Section meeting will be held at Ramapo College of New Jersey, joint with MATYCNJ, on March 28, 2026.

GSUMC: The 2025 Garden State Undergraduate Mathematics Conference will be held in conjunction with the Spring Meeting of the NJ Section at Ramapo College of New Jersey.

MathFest: The 2026 MathFest will be in Boston, MA, August 5-8, 2026**.**

Call for Contributed Papers, Topics for Special Sessions, and Lunch Table Discussion Topics for the Spring 2026 MAA-NJ Meeting

We are seeking abstracts for review for the General Contributed Paper Sessions. MAA Contributed Papers may focus on any aspect of mathematics. Examples include expository mathematics, connections within mathematics or between mathematics and other disciplines, the undergraduate mathematics curriculum, diversity, equity, inclusion in mathematics, social justice in the classroom, teaching, data analysis, or mathematical pedagogy. The CPS committee seeks and encourages proposals that will contribute toward a well-balanced and scholarly program that represents the MAA's mission. Please send the title and abstract to Kathy Turrisi, Executive Board Member and Chair of the CPS Committee, at:
Kathy.Turrisi@centenaryuniversity.edu.

MAA members interested in proposing a Topic for a Special Session or are interested in leading a Lunch Table Discussion should submit their proposals to Kathy Turrisi at **Kathy.Turrisi@centenaryuniversity.edu**.

2025 Sr. Stephanie Sloyan Award for Distinguished Service
New Jersey Section of the Mathematical Association of America

Dr. Dawn Nelson

The recipient of the 2025 Sr. Stephanie Sloyan Award for Distinguished Service from the New Jersey section of the Mathematical Association of America (MAA-NJ) is Dr. Dawn Nelson, Associate Professor and Chair of the Department of Mathematics and Statistics at Saint Peter's University.

Dawn's service to the New Jersey section started in 2015 when she volunteered as a judge for student talks sessions at the Garden State Undergraduate Mathematics Conference. In 2019, she was appointed as the MAA-NJ Program Editor and has held that role or the past six years. Dawn was elected as the Vice Chair for Spring Meetings in 2022 and is currently in her second term. While on the executive board, Dawn has served on the teaching award committee and the service award committee.

Dawn earned a B.A. in Mathematics from Williams College and a Ph.D. in Mathematics from Brandeis University. Her research interests include Number Theory (variations on Fibonacci numbers and number bracelets). At Saint Peter's University, she is an active member of many committees such as Student Learning Outcomes, Curriculum, and Enrollment Council. She was recently elected to serve as Chair of the University Chairs and Directors Group.

The New Jersey Section is delighted to have benefited from the many years of service provided by Dawn over the past ten years and in appreciation for her contributions has awarded her with the 2025 Sr. Stephanie Sloyan Award for Distinguished Service.

Response from Dr. Nelson

I am truly honored to receive the 2025 Sr. Stephanie Sloyan Award for Distinguished Service from the New Jersey Section of the Mathematical Association of America. This recognition means a great deal to me.

I have learned so much from you all and from our meetings. I've been inspired to continue my research and to make pedagogical changes in my classes; and your support has given me the confidence to take on new leadership roles at Saint Peter's.

I want to thank everyone who contributes their time and energy to making our Section such a welcoming and engaging community. It has been a true pleasure to serve alongside you and to celebrate mathematics and mathematics education together. We do what we do for our students and for the mathematics community; and even though sometimes that goes unacknowledged, it is always appreciated.

Thank you again for this meaningful recognition.

Report on the 2025 MathFest MAA Congress Meeting

Respectfully submitted by Paul von Dohlen, William Paterson University

The MAA Congress met on August 6, 2025 from 8:30am until 4pm, in Sacramento, CA as part of MathFest 2025. The meeting began with a welcome from Victor Piercey, the MAA Congress Chair. He indicated that the general theme for this meeting was "thriving in challenging times." Reports from the MAA Executive Director, MAA Senior Director for Programs, and MAA President followed.

Michael Pearson (MAA Executive Director) emphasized that the MAA is a member-driven organization and highlighted the importance of strengthening advocacy in response to public attacks on higher education. He noted recent efforts to protect the NSF STEM education directorate, including work in Washington that helped secure Senate support against massive, proposed budget cuts. The MAA has hired a consultant to expand its advocacy role and plans to lead more of its own initiatives. Members are encouraged to explore resources at maa.org/advocacy and help promote advocacy efforts.

Audrey Malagon (MAA Senior Director for Programs) shared updates on several initiatives. She allowed colleagues to share specifics. Steve Dunbar, Chair of the Council on Competitions, announced the site selection process for the 2026 USAMO, where about 500 top high school students will compete at regional host campuses, encouraging members to promote hosting opportunities. Catherine Paolucci, MAA Director of Outreach and Impact, introduced the MAA INTEGRATE program, designed to strengthen networks between K–12 and higher education through pilots such as a Math Club Handbook project and a Building Bridges and Communities section initiative. The program aims to expand the value of MAA membership, counter perceptions of elitism in mathematics, and foster broader engagement in civil society.

Jenna Carpenter (MAA President) noted that she just began her term but reflected on her long history with the MAA and shared highlights of recent visits to several MAA sections. She promoted MAA Notes Volume 99 on teaching introductory statistics with data-centric methods, available free to members. She also spotlighted the NSF-funded ASEE Inclusive Mindset Project, which seeks to modernize engineering curricula, with MAA serving as a key partner in updating the mathematics component.

In addition to those reports, Hortensia Soto (MAA Past President) updated congress members on the search for the next MAA Executive Director as Michael Pearson will be retiring in September 2026. A search committee has begun work with a goal of having a contract signed

by the beginning of 2026. Then, during a MAA Board of Directors Panel Discussion, board members answered questions on membership, sections, communication challenges, AI, and advocacy. Following the panel were reports on the section visitors program and the Carol Crawford Award.

The afternoon portion of the meeting included the MAA Council Roundtable Discussions which allowed participants to meet the MAA Council Chairs and to learn about each council's responsibilities. It also involved discussions on "Thriving in a Toxic Environment" meant to provide congress representatives with ideas and strategies in dealing with the challenges facing the current mathematics community. The meeting concluded with congress elections and closing remarks by Victor Piercey.

Social Media Information

Check us out!

Email: maanj.socialmedia@gmail.com
Instagram: instagram.com/maanewjersey
Twitter/X: twitter.com/maanewjersey
Bluesky: maanewjersey.bsky.social

MAA-NJ Committees

Awards Committee: Grace Cook, Bloomfield College of Montclair State University; Tom Hagedorn (chair), The College of New Jersey; Jonathan Weisbrod (ex-officio), Rowan College at Burlington County.

Teaching Award Committee: Grace Cook, Bloomfield College of Montclair State University; Aihua Li, Montclair State University; Dawn Nelson, Saint Peter's University; Sheila Tabanli, Rutgers University; Jonathan Weisbrod (ex- officio), Rowan College at Burlington County.

Nominating Committee: Amanda Beecher, Ramapo College; Karen Clark (chair), The College of New Jersey; Jonathan Weisbrod (ex-officio), Rowan College at Burlington County; Chung Wong, County College of Morris.

Contributed Paper Committee: Grace Cook, Bloomfield College of Montclair State University; Kathy Turrisi (chair), Centenary University.

MAA-NJ Section Officers

Chair	Jonathan Weisbrod, Rowan College at Burlington County
Secretary	Reva Narasimhan, Kean University
Treasurer	Dirck Uptegrove
Vice-Chair for Fall Meetings	Joseph Coyle, Monmouth University
Vice-Chair for Spring Meetings	Dawn Nelson, Saint Peter's University
Vice-Chair for Speakers	Ik Jae Lee, Rowan University
Vice-Chair for Student Activities	Lee Collins, Atlantic Cape Community College
Vice-Chair for Two-Year Colleges	Christopher Cooper, Rowan College at Burlington County
GSUMC Co-Directors	Lee Collins, Atlantic Cape Community College; Joseph Coyle, Monmouth University
Book Sale Coordinators	Dirck Uptegrove; Elizabeth Uptegrove, Felician University (emeritus)
Door Prize Coordinator	Rasha Abadir, Rutgers University
Contributed Paper and Lunch Table Organizer	Kathy Turrisi, Centenary University
Liaison Coordinator	Sheila Tabanli, Rutgers University
Program Editor	Dawn Nelson, Saint Peter's University
Project NJ-NExT Co-Directors	Matthew Mizuhara, The College of New Jersey; Chung Wong, County College of Morris
Social Media Coordinator	Grace Cook, Bloomfield College of Montclair State University
Web Administrator	Dirck Uptegrove
MAA-NJ Congress Representative	Paul von Dohlen, William Paterson University