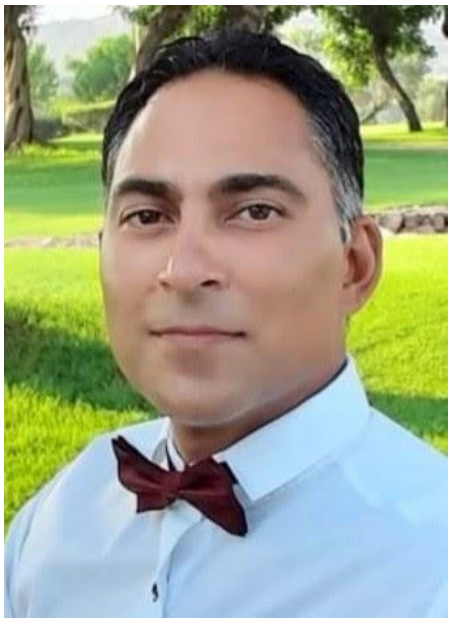
MAA SEAWAY SPRING 2024
Invited Speakers & Workshop



Shahin Mehdipour Ataee
SUNY Fredonia

Talk: Friday Banquet Speaker

Bio: Shahin Mehdipour Ataee successfully earned his Ph.D. in Computer Engineering from Eastern Mediterranean University, Cyprus, in 2018. His research primarily centered around Semantic Web Services, with a specific emphasis on crafting intelligent communicating agents.
Post-graduation, his professional journey has led him to explore diverse facets of Machine Learning and Artificial Intelligence.

Having started his career as a professor in Computer Engineering and Science courses in 2014, Shahin now serves as an Assistant Professor of Computer Science at the State University of New York in Fredonia. His dedication to both academic research and teaching underscores his commitment to advancing knowledge and fostering learning in the field of computer science.

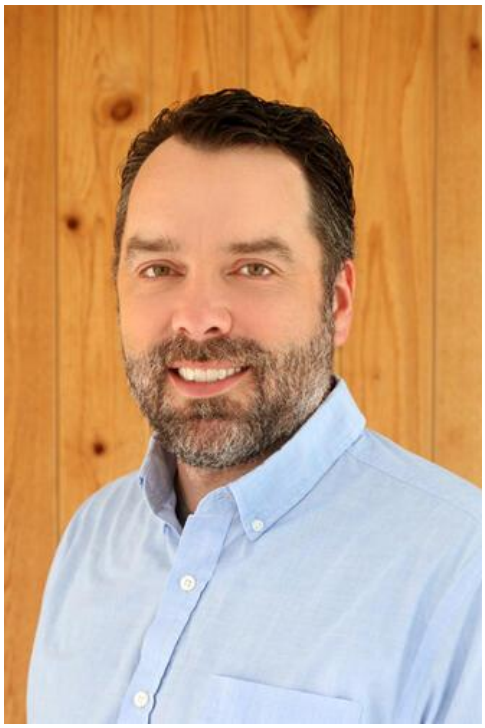
Title: Artificial Intelligence From A Simple Mathematical Perspective
Abstract: In this talk, we delve into the fascinating world of artificial intelligence (AI) through the lens of simple mathematical concepts. Artificial Intelligence has become an integral part of our modern lives, revolutionizing industries and reshaping our understanding of technology. However, behind the complex algorithms and advanced neural networks lies a foundation built upon basic mathematical principles.

Throughout the session, we will explore how fundamental mathematical concepts such as linear algebra, probability theory, and calculus underpin the development and functioning of AI systems. By breaking down these intricate AI processes into their mathematical components, we aim to demystify the technology and make it more accessible to a wider audience.

Moreover, we will discuss the historical evolution of AI and its connection to mathematics, tracing its roots from Alan Turing's pioneering work to the cutting-edge machine learning models of today. By understanding the mathematical principles driving AI, attendees will gain insights into how these systems learn, reason, and make decisions.

Furthermore, we will examine real-world applications of AI from a mathematical perspective, ranging from image recognition and natural language processing to autonomous vehicles and recommender systems. By analyzing these applications through the lens of mathematics, attendees will develop a deeper appreciation for the role of mathematical thinking in shaping the future of AI.

Ultimately, this talk aims to equip attendees with a foundational understanding of artificial intelligence rooted in simple mathematical concepts. By bridging the gap between AI and mathematics, we hope to inspire curiosity and empower individuals to explore the limitless possibilities of this transformative technology. Join us on a journey where mathematics meets artificial intelligence, unlocking new insights and opportunities along the way.



Aaron Heap
SUNY Geneseo

Talk: Gehman Lecture

Bio: Aaron Heap earned his PhD in Mathematics from Rice University in 2004, studying Algebraic and Geometric Topology. He is a Roemer Supported Professor at SUNY Geneseo, where he serves as Chair of the Department of Mathematics. He has been honored with several teaching awards, including the SUNY Chancellor's Award for Excellence in Teaching. His current research interests include knot theory, mapping class groups, 3D printing, and online educational tools. Beyond his academic passions and job-related activities, Aaron enjoys spending time with his wonderful wife, playing games with his two kids, doing construction and remodeling work, and completing items from the long list of projects that his wife makes him do.

Title: Tied up in Knots – An Adventure in Undergraduate Research
Abstract: Join us for an introduction to knot theory and knot mosaics. Knot theory is a fun branch of mathematics with many useful applications. This talk isn't about those! We will discuss some knot theory, but we will also discuss some not theory. The not theory portion will involve some knot history, but it will also involve some not history because we will discuss some knot results from the present. Make sure you are present because those who are not present

might miss out on knots but will not miss out on presents. There will be an occasional knot pun, a smattering of knot fun, and a revelation that the work is not done.

Nancy Ann Neudauer
Pacifica University

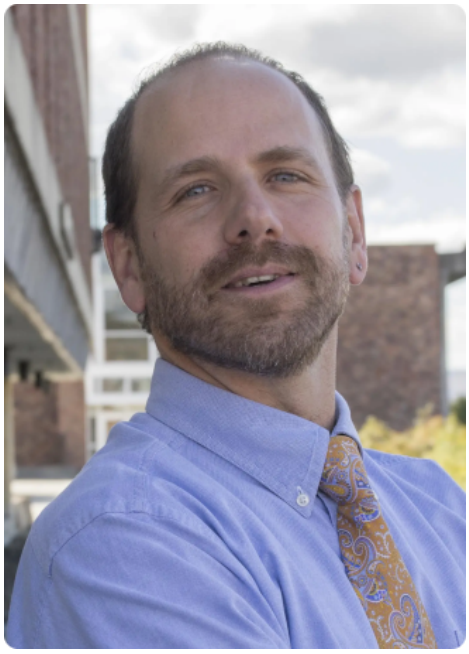
Talk: Invited Speaker

Bio: Nancy Ann Neudauer is the Thomas and Joyce Holce Professor of Science and Professor of Mathematics at Pacific University, Associate Secretary of the MAA, and Co-Director of the Center for Undergraduate Research in Mathematics (CURM). She received her PhD in Mathematics from the University of Wisconsin and her research in matroid theory and graph theory has been supported by grants from the Simons Foundation, the Fulbright Program, the National Science Foundation, and an endowed Research Chair. She is on the Board of Directors and the Congress of the MAA, Program Chair for the Cascadia Combinatorial Feast since 2001, was Visiting Mathematician to the national offices of the MAA, Director of the MAA Dolciani Mathematics Enrichment Grant Program for 13 years, a PI on the NSF-funded META Math (the Mathematical Education of Teachers as an Application of Mathematics) project, Associate Director for PNW Section NExT for 19 years, and recipient of a Distinguished Teaching Award and a Meritorious Service Award. As a Fulbright Specialist, her outreach extends to African Institute of Mathematical Sciences (AIMS) Centres in South Africa, Tanzania, Ghana, Cameroon, and Rwanda and she is the recipient of a Fulbright Global Scholars Award. She is particularly interested in bringing matroids to a wider audience by introducing them to working mathematicians and their students in every corner of the world.

Title: Matroids You Have Known
Abstract: Matroids show up several times in the undergraduate curriculum, but most of us don't know them by name. In 1933, three Harvard junior-fellows tied together some recurring themes in mathematics, into what Gian Carlo Rota called one of the most important ideas of our day. They were finding properties of dependence in multiple mathematical structures. What resulted is the matroid, which abstracts notions of algebraic dependence, linear independence, and geometric dependence, thus unifying several areas of mathematics. The usefulness of matroids

to pure mathematical research is similar to that of groups – by studying an abstract version of phenomena that occur in different realms of mathematics, we learn something about all those realms simultaneously.

We find that matroids are everywhere: Vector spaces are matroids; We can define matroids on a graph. Matroids are useful in situations that are modeled by both graphs and matrices. Yet many matroids cannot be represented by a graph nor a collection of vectors over any field. We consider the essential role of matroids in combinatorial optimization.



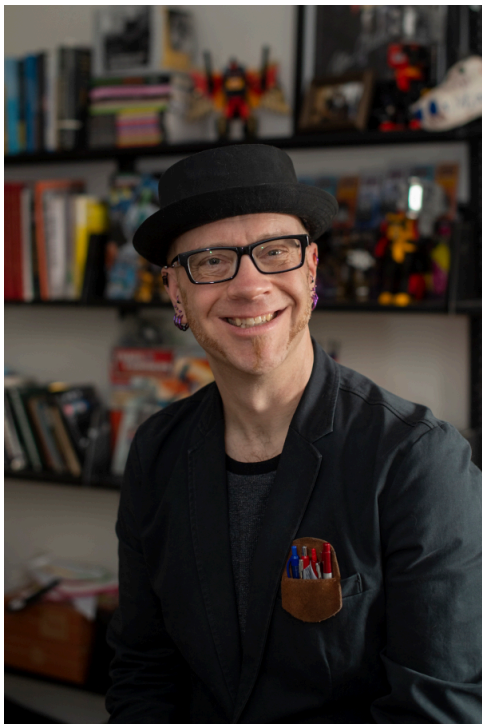
Thomas Pfaff
Ithaca College

Talk: Invited Address

Bio: Thomas J. Pfaff is chair and professor of mathematics at Ithaca College. He is the author of two books: R for College Mathematics and Statistics (Chapman and Hall/CRC 2019) and Applied Calculus with R (Springer 2023). He also maintains the sustainabilitymath.org and briefedbydata.substack.com websites and blog.

Title: Is anyone truly using math to understand real-world problems?

Abstract: If the response was no, there would be no talk to give. In my humble opinion, the math community is frequently unaware of the math being used outside of math journals. There are several good reasons for this. This session aims to break down some of these barriers by providing examples of math being utilized to help people understand modern-day challenges. From electric vehicles to whales, we'll look at some interesting mathematics that can be utilized to supplement our courses or serve as the foundation for student projects.



Daniel M. Look (St. Lawrence University)

WORKSHOP: 3:00-5:00, April 19

Bio: Dan received his PhD from Boston University studying Complex Dynamics and he currently serves as the Rutherford Professor of Mathematics at St. Lawrence University. His current research includes the dynamics of rational functions (with a particular interest in Sierpinski curve Julia sets and Julia sets related to the geometric action of circle inversion), text mining/stylometry, popular culture uses of mathematics in early 20th century pulp fiction, and mathematics pedagogy. Among other work, he has performed stylometric analyses of Robert E. Howard's Conan stories and their various pastiches and written about H. P. Lovecraft's use of non-Euclidean geometry for an invited paper in *Lovecraft Annual*.

Title: Exploring Alternatives to Traditional Grading

Abstract: In the classroom, evaluation typically manifests as letter/numerical grades, where points are allocated for assessments and a weighted average determines final grades. However, outside the classroom, evaluation takes a markedly different form. Recommendation letters and performance reviews do not typically use numerical scores, while peer reviews for journals offer limited options: reject, revise and resubmit, or accept. Both peer and performance reviews incorporate feedback loops: engage in an action, receive feedback, reflect on feedback, enact changes, and iterate the process. This feedback loop is indispensable for learning; seldom do we perform a task just once and consider it complete. Classrooms tend to be the outlier, often lacking this feedback loop. Students submit assignments and receive a 'locked in' grade accompanied by feedback that may go unread, or if read, may not be comprehended or deemed actionable.

In this interactive workshop, we will explore alternatives to the traditional grading scheme, such as ungrading, specifications grading, standards-based grading, contract grading, proficiency grading, and others. Whether you are considering incremental adjustments or a comprehensive overhaul of your course, the aim is for attendees to depart with fresh ideas to contemplate.

This workshop welcomes all participants, whether already immersed in alternative assessment methods or encountering the concept for the first time.