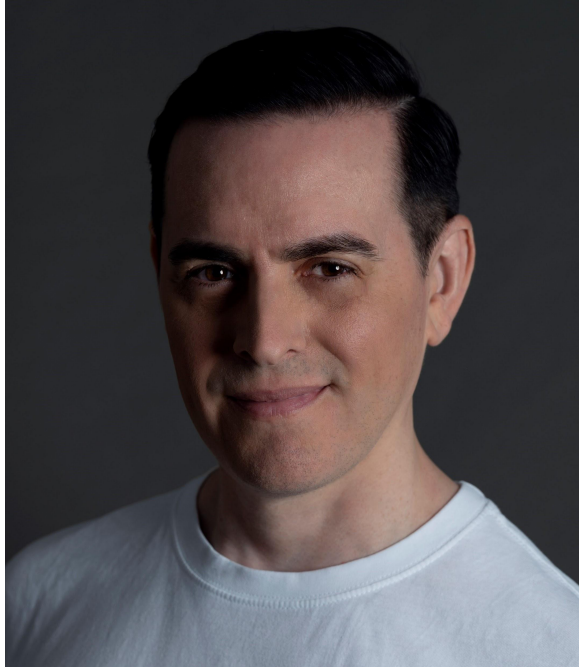


Invited Speakers

Spring 2023 MAA Seaway Section Meeting



Banquet Speaker

Anthony Bonato, University of Toronto, Metro

Dots and Lines: The Hidden Networks Around Us

Networks measure interactions. The last twenty years, especially, have seen an explosion of network methods applied to every discipline imaginable. From early examples like the web graph, we now study networks from food webs, mobile calls, political votes, smart grids, characters in novels, conflicts, protein interactions in living cells, supply chains,

Bitcoin transactions, and neural connections in the brain.

Although networks are everywhere, many are invisible. Mathematicians are only beginning to reveal these hidden networks and unlock their secrets. We give a guided tour of the modern field of network science, with insights along the way into what makes networks tick.

Biography:

Dr. Anthony Bonato is an expert in graph theory and network science. He authored over 140 papers with over 120 co-authors. He is the author of five books, with the most recent one *An Invitation to Pursuit-Evasion Games and Graph Theory* published by the AMS in 2022. Bonato is currently a full Professor in the Department of Mathematics at Toronto Metropolitan University. Bonato has a passion for writing and communicating mathematics, and his words were published in *Salon*, *The Conversation*, and *Maclean's*



Gehman Lecture

Penny Haxell, University of Waterloo

Graph Theory for the Cruise Director

In this lecture I'll share two of my favourite topics to teach in graph theory courses. I'll describe them both as solutions to problems that might be faced by the cruise director on a luxury cruise ship, who is responsible for arranging all the social events on board. How can the passengers be organised into harmonious groups for dinner seating or excursions? How can we find a good way to assign partners for an evening of tango lessons?

We can formulate these questions as certain graph colouring and matching problems, that have particularly beautiful solutions. We'll even solve one of them together on the spot, using a human computer made up of audience members.

Biography:

Penny Haxell received her PhD in pure mathematics from the University of Cambridge in 1993. In the same year, she joined the Department of Combinatorics and Optimization at the University of Waterloo, becoming a full professor in 2004. She spent one year as a visiting professor at Bell Laboratories in Murray Hill, NJ in 2002. Her research interests focus on extremal combinatorics and graph theory. She is a recipient of the Krieger-Nelson Prize of the Canadian Mathematical Society for outstanding research by a female mathematician (2006), a Friedrich Wilhelm Bessel Research Award of the Alexander von Humboldt Foundation (2011), and the Faculty of Mathematics Award for Distinction in Teaching of the University of Waterloo (2014).



MAA AWM Lecturer

Karen Lange, Wellesley
College

*Different Problems,
Common Threads:
Computing the difficulty
of mathematical
problems*

Mathematics is filled with
theorems that state the

existence of a desired object. For example, a result known as Weak König's Lemma (which I'll introduce) states that "every binary tree with infinitely many nodes has an infinite path". But just because we know an object exists, doesn't mean we can find it. Given Weak König's Lemma, it's natural to ask whether we can compute a path through a given binary tree with infinitely many nodes. It turns out the answer to this "Path Problem" is "no", so we say that the problem is not "computable". But then just what exactly is the computational power of this Path Problem?

Using this Path Problem as a test case, we will explore the key ideas behind taking a "computable" perspective on mathematics (over an "existence" one) and describe an approach for measuring the computational power of mathematical problems. We'll see that the computational power of problems varies widely and studying problems' power helps to illuminate what really makes problems "tick".

Biography:

Karen Lange is the Theresa Mall Mullarkey Associate Professor of mathematics at Wellesley College. In her research, she studies the "balance scales" used to calibrate computational information and applies these tools to measure the difficulty of algebraic problems. She's also passionate about undergraduate mathematics education and teaches a seminar on writing for the public about mathematics. She earned her undergraduate degree at Swarthmore College and her doctoral degree at the University of Chicago, and she completed an NSF Postdoctoral Fellowship at the University of Notre Dame.



Invited Address

Fredreic Gourdeau, Université Laval

A mathematicians' journey in education and outreach

My journey as a mathematics educator started more than 25 years ago, at Université Laval. Early on, I started teaching pre-service courses for elementary and secondary school teachers, and I attended annual meetings of the Canadian Mathematics Education Study Group. These early experiences led me to reflect on the type of mathematical experiences pre-service teachers (K-12)

can benefit from. While I have learnt a great deal with colleagues in mathematics and mathematics education in different settings, as well as from some reading and my own experience, there is still much I wonder about.

Over the years, I also had the chance to work with and get to know some fantastic school consultants and in-service teachers (through my involvement with various associations and projects). Gradually, I saw that there was a space where I could contribute: in this space, my aim is specifically to support in-service teachers. Over the years, this part of my work grew in importance and some of the material we developed is accessible on the “La magie des maths” website (lamagiedesmaths.ulaval.ca). (Some activities are available in English at amazingmaths.ulaval.ca.)

The talk will be about teaching strategies and outreach, as I try to convey an interesting mix of activities and intentions, both for in-service and pre-service teachers. I hope it will be the beginning of many conversations.

Biography:

Frédéric Gourdeau completed his Ph.D. in Functional analysis at the University of Cambridge in 1989 and is full professor at the Department of Mathematics and Statistic of Université Laval, which he chaired from 2010 to 2018. In 2014, he was awarded the Adrien Pouliot Award of the CMS in recognition of his outstanding contributions to mathematics education in Canada. He is also a recipient of the 3M National Teaching Fellowship (2006) and of the Excellence in Teaching Award from the CMS (2005). Founder of the Association québécoise des jeux mathématiques (AQJM), which provides mathematics activities that support elementary and secondary school teachers, he regularly gives talks or leads sessions for teachers. He is a keen hiker, a happy grandfather, and enjoys playing board games and team sports.