

Schedule of Talks

Math For All Virtual 2026

April 10 -11, 2026

MFA Virtual 2026

The full conference schedule is available on the Math For All website: <https://www.mathforallconference.com/virtual#h.g1xzxu6fxtav>

Schedule of Talks

All times are in Central Time (GMT -5)!

Time	Room 1	Room 2	Room 3	Room 4
10:45	Reena Tandon	Canceled	Alex Lee	Lucas Carreño
11:05	Olha Sus	Nhung Nguyen	Pedro Moranchel Jr. Gabriel Michael Chavez Ignacio Mendoza Maravilla	Dev Sinha
11:25	Ender Minyard	Charles Stevenson	Canceled	Hemanta Kunwar

One-Slide Talks

To appear in the order below:

Hannah Dempsey

Oregon State University

Pointwise Convergence of Solutions to the Linear Schrödinger Equation

Chonilo Saldon

Zamboanga del Norte National High School - Turno

Adding Up Impact: The Growth of Math Outreach Initiated by a Public School in the Philippines

Andrew Triska

The Open University, Milton Keynes

Zeta-workhorse: A Python library for graph zeta functions and spectral invariants.

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Plenary Talk Abstracts

Jayadev Athreya

University of Washington

Bouncing Around: The Language of Billiards in Polygons

How many ways can a billiard ball bounce around a polygonal table? This seemingly simple question opens the door to some surprisingly deep mathematics. It turns out we don't know much about mathematical billiards in polygons, even though they are very simple models of Newtonian mechanics.

Ila Varma

University of Toronto

Mathematics for the People

This lecture will be an invitation to begin imagining what the subject and teaching of mathematics would evolve into if we prioritized its value to everyday people all around the world. Such a revolution of the subject would not only require junior mathematicians' imagination; we will need you to solve the most difficult problems that have eluded us for centuries: organizing yourselves and your mathematics classes, building connections with the communities where you study and where you come from, and critically thinking about the structures of society the way we enjoy studying mathematical structures, to name a few. During the lecture, we will take some time for radical imagining, after discussing the historical and present-day context of why much of our (mathematical) education limits our imagination, and conclude with strategies for developing the tools necessary for collectively fighting towards a mathematics for the people.

Short Talk Abstracts

Lucas Carreño

Southern CT State University

Solving equations over groups with the wreath product

An equation on a group is one where we have a product of group elements that is equal to the identity, where one of the elements is unknown. We'll look at solving equations where no solution exists within the original group, but find out how to always find a solution of certain equations by embedding the group into a larger one by using a wreath product to construct the necessary over group, using the methods proven by both Baumslag and Levin.

Hemanta Kunwar

Embry-Riddle Aeronautical University

Global-local method for the poroelasticity model with localized pressure effects

In many poroelasticity applications, pressure effects are confined to a small region, making it inefficient and possibly unnecessary to solve the full system across the entire domain. Instead, we can solve the poroelasticity problem locally, where pressure effects are significant, and use a simpler linear elasticity model elsewhere. This creates an elasticity-poroelasticity interface problem with transmission conditions. We propose a non-intrusive global-local algorithm that iteratively solves the elasticity problem in the entire (global) domain and the poroelasticity problem only in a local domain, ensuring proper transmission conditions across the interface. This approach, which extends the global-local concept to coupled multi-physics systems, significantly reduces computational cost, especially when the local domain is much smaller than the global one. Numerical experiments demonstrate the robustness and efficiency of the method, showcasing its potential for providing a scalable and efficient solution for multi-physics problems with localized effects of a single physical process.

Alex Lee

Computational Search for Ribbon Links

Pomona College

We developed a computational method to screen for potential ribbon links among links up to 14 crossings. This approach allowed an automated analysis of approximately 120,000 links, which would be impractical to examine manually. The methods are based on obstruction conditions where failure indicates a link is certainly not ribbon, though success does not guarantee a link is certainly ribbon. Obstructions included whether it was possible to define a Jones determinant for a given link. We developed a Sage script to apply these obstructions to each link, which allowed us to narrow down to less than 100 candidate links. Whether our computational candidates are actually ribbon remains an open problem for manual verification.

Gabriel Michael Chavez

Ignacio Mendoza Maravilla

Pedro Moranchel Jr.

An Introduction to Shadow Spaces and Resolution Enumeration

Arizona State University

California State University Monterey Bay

We introduce shadow spaces, the collection of all knot diagrams obtained by resolving every crossing of a knot shadow. For a shadow with n crossings, there are 2^n possible resolutions, but brute-force classification quickly becomes infeasible. To address this, we exploit combinatorial group actions on binary strings representing resolutions. For $(2,q)$ -torus knot shadows, the crossings form a regular q -gon with dihedral symmetry. By applying Burnside's Lemma, we enumerate orbit representatives (binary bracelets), which serve as a minimal basis for the shadow space. This reduces the classification problem from 2^q cases to only $\beta(q)$, with reductions exceeding 99% for large q . We further incorporate mirror equivalence, yielding closed formulas for in terms of bracelets and their self-complementary subclasses. Vector space analogies frame the shadow space as a $\mathbb{Z}_2$ -module, with orbits forming a basis akin to linear independence. For $(2,q)$ -torus knots, we show resolutions collapse to closures of uniform 2-strand braids, allowing precise enumeration of unknots, torus knots, and links via binomial coefficients. Tables provide exact distributions of knot types across resolutions. Extensions to $(3,q)$ -torus knots illustrate the combinatorial explosion of group actions, motivating further algebraic generalizations. Our results demonstrate how symmetry and orbit enumeration provide a powerful, scalable framework for the resolution classification of torus knots.

Ender Minyard

Proof Assistants for Everybody

New York University

A proof assistant is a programming language and/or user interface that enables the creation of computer-aided proofs. Proof assistants are interactive theorem provers. Starling is a proof assistant designed for ease of use by novices.

Nhung Nguyen

Identifying defective units in infinite periodic arrays of sources

Kansas State University

This talk focuses on detecting defective units in unbounded periodic arrays of radiating sources, motivated by nondestructive evaluation of large-scale source systems. A key challenge is that defects break the periodicity of the structure, which leads us to employ the Floquet-Bloch transform to recover it. Combining this approach with our stable imaging function, we develop a numerical method capable of identifying defective sources. The method determines not only the number of defects but also their locations and intensities. Numerical experiments confirm its robustness, accuracy, and effectiveness. This is joint work with Dinh-Liem Nguyen and Thi-Phong Nguyen.

Dev Sinha

Seeing (fundamental) groups through ordered intersections

University of Oregon

A primary way to "measure" a sub-manifold is through a signed count of intersections with a sub manifold of complementary dimension. For example, winding number in the punctured plane can be defined through intersections with the positive x-axis. For loops, we can consider multiple sub manifolds and consider combinatorics of intersections with them. For example, one can count the intersections with a sub manifold T which come after an intersection with a sub manifold S . This is a way to "see" a fundamental group, and in work with Gadish, Ozbek and Walter we show this generate all polynomial functions. (A linear function from a group to a ring is a homomorphism; then in general f is degree n if for any group element g the function $f(x+g) - f(x)$ is degree $n-1$.) We focus on concrete examples including link complements (a focus of work in progress with Friedman, Gadish, Koytcheff and Walter) and surfaces.

Charles Stevenson

Dual Roles of Noise

Fitchburg State University

We typically view noise as a flaw to be corrected, but post-quantum cryptography treats it as a shield. Our research explores this duality by connecting the mechanics of Error Correcting Codes with Lattice Based Cryptography. Through hands-on implementation and toy models, we demonstrate that the linear algebra used to recover information is fundamentally linked to the math used to encrypt it. These aren't just two separate fields they are a unified toolkit for the future of digital security.

Olha Sus

Connecting Multiplicative Structures Across Contexts: Students' "Product Layer" Reasoning in Water Pressure and Electricity Tasks

Tufts University

Students often struggle to interpret the multiplicative structure within integrals – what we call the "product layer" ($f(x) \cdot dx$) – when reasoning about applied problems. In this study, we analyze the reasoning of Melinda, an undergraduate in a calculus-based physics course, as she works on two tasks: estimating the total force on a tank wall (water pressure) and the total voltage across a capacitor (electricity). Using knowledge in pieces perspective, we examine how Melinda connects symbolic, mathematical, and physical ideas when setting up integrals. Melinda frequently interprets integration as summation of small pieces or as area under a curve but struggles to coordinate multiplicative relationships among varying quantities (e.g., pressure $\cdot$ area, current $\cdot$ time). These findings suggest that challenges with product layer reasoning persist across contexts, highlighting the need for instruction that explicitly supports blended multiplicative reasoning.

Reena Tandon

Mastery-Based Grading in a HyFlex Classroom: Strategies to Enhance Student Engagement and Success

Saint Louis Community college, Forest park

This session explores the implementation of mastery-based grading (MBG) in a HyFlex mathematics classroom to enhance student engagement, accountability, and success. Drawing on experiences from Precalculus Trigonometry and Calculus I courses, the presenter shares strategies for designing mastery-based assessments, offering reassessment opportunities, and integrating active learning across in-person and online modalities. Participants will learn how MBG supports deeper understanding, flexibility, and student persistence. Practical insights, challenges, and lessons learned will be discussed, along with approaches to promote equitable learning and meaningful student participation in a HyFlex environment.