# Frontiers of Mathematics Lecture
## Combinatorics of the amplituhedron

## Abstract

The amplituhedron is a geometric object introduced by Arkani-Hamed and Trnka to compute scattering amplitudes in N=4 super Yang Mills theory. It generalizes interesting objects such as cyclic polytopes and the positive Grassmannian. It has connections to tropical geometry, cluster algebras, and combinatorics (plane partitions, Catalan numbers). I'll give a gentle introduction to the amplituhedron, then survey some recent progress on some of the main conjectures about the amplituhedron: the Magic Number Conjecture, the BCFW tiling conjecture, and the Cluster Adjacency conjecture.

**Professor Lauren K Williams**
*Harvard University*

**Date :**
19 March, 2025 (Wednesday)

**Time :**
5:00 – 6:00 pm
(Tea Reception starts at 4:30 pm)

**Venue :**
Lecture Theatre C, LG1/F
Chow Yei Ching Building
The University of Hong Kong

## Biography

Lauren Williams is the Dwight Parker Robinson Professor of mathematics at Harvard University and the Sally Starling Seaver Professor at the Radcliffe Institute. She obtained her BA from Harvard, her PhD from MIT, and was a faculty member at UC Berkeley from 2009 to 2018 before returning to Harvard. She is the recipient of a Sloan Research Fellowship, an NSF CAREER award, the AWM-Microsoft research prize in algebra and number theory, a Simons Fellowship, and a Guggenheim Fellowship.