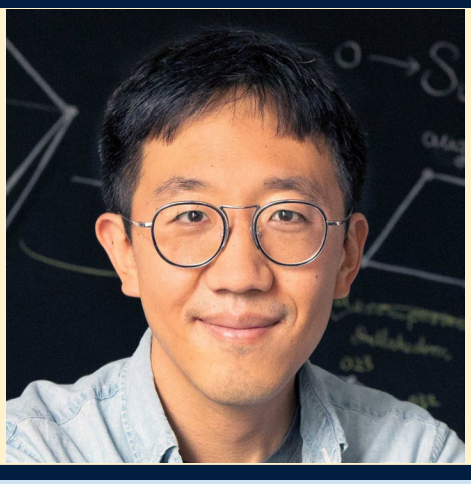
*Department of Mathematics*

# Alexander Ziwet Lectures

## September 10-12, 2024



## June Huh

**Professor of Mathematics**
**Princeton University**

*A reception for Professor Huh will be held on Tuesday, September 10, at 5:00 p.m. in the Mathematics Upper Atrium, East Hall*

## Lorentzian Polynomials, Matroids over Hyperfields, and Related Topics

**Lecture I: Tuesday, September 10 - 4:00 p.m. - 1360 East Hall - *Reception to Follow***

**Lecture II: Wednesday, September 11 - 4:00 p.m. - 1360 East Hall**

**Lecture III: Thursday, September 12 - 4:00 p.m. - 4448 East Hall**

Lorentzian polynomials serve as a bridge between continuous and discrete convex analysis, with tropical geometry providing the critical link. The tropical connection is used to produce Lorentzian polynomials from discrete convex functions, leading for example to a short proof of Mason's conjecture on the number of independent sets of a matroid. This lecture series will explore the intricate relationships among Grassmannians over hyperfields, dequantization processes, and the theory of Lorentzian polynomials. In ongoing collaborative work with Matt Baker, Mario Kummer, and Oliver Lorscheid, we extend the connection between Lorentzian polynomials and discrete convex functions to matroids over triangular hyperfields, as introduced by Viro. This extension deepens our understanding of the space of Lorentzian polynomials, revealing a complex interplay among analysis, combinatorics, and geometry.

The three lectures in this series are designed to be accessible to a broad audience and appropriate for a Department Colloquium.

*Among his many honors, Prof. Huh is a recipient of the 2022 Fields Medal, the 2022 MacArthur Fellowship, and the 2019 New Horizons in Mathematics Prize. He received his PhD in Mathematics from U-M in 2014.*

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