

# Fields Medal Lecture Series

March 17, 2023

## Log-concavity in combinatorics: the work of June Huh

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In 2010, while still a graduate student, June Huh stunned the mathematical world with his proof of Read's celebrated unimodality conjecture for chromatic polynomials of graphs. Together with his partial proof of the Heron-Rota-Welsh log-concavity conjecture for characteristic polynomials of matroids, this constituted a major advance on conjectures that had resisted four decades of effort.

Huh and collaborators followed this up with numerous striking results for general matroids - log-concavity of the characteristic polynomial, ultra log-concavity of the  $f$ -polynomial and the Dowling-Wilson conjecture, among others. I will present an overview of these theorems, with a focus on the combinatorial side. Huh's methods now constitute the new area of "Hodge theory in combinatorics", and I will make brief comments on these. The talk will be widely accessible, with minimal prerequisites.