International
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Short citation:

June Huh is awarded the Fields Medal 2022 for bringing the ideas of Hodge theory to combinatorics, the proof of the Dowling–Wilson conjecture for geometric lattices, the proof of the Heron–Rota–Welsh conjecture for matroids, the development of the theory of Lorentzian polynomials, and the proof of the strong Mason conjecture.

Long citation:

Using methods of Hodge theory, tropical geometry, and singularity theory, June Huh, with his collaborators, has transformed the field of geometric combinatorics.

June Huh and Botong Wang used tools of algebraic geometry and intersection theory to prove Dowling–Wilson conjecture for realizable matroids.

Karim Adiprasito, June Huh, and Eric Katz discovered combinatorial analogues of Hodge theory and proved the hard Lefschetz theorem and the Hodge-Riemann relations for arbitrary matroids. They used these results to resolve the Heron–Rota–Welsh conjecture about the log-concavity of the characteristic polynomial of a matroid.

Petter Brändén and June Huh developed the theory of Lorentzian polynomials, connecting continuous and discrete convex analysis via tropical geometry. They proved the strong Mason conjecture for matroids and discovered applications in different areas of mathematics from projective algebraic geometry to Potts models in statistical mechanics.