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The Cubical Route to Understanding Groups

Cube complexes have come to play an increasingly central role within geometric group theory, as their connection to right-angled Artin groups provides a powerful combinatorial bridge between geometry and algebra. This talk will introduce nonpositively curved cube complexes, and then describe the developments that recently culminated in the resolution of the virtual Haken conjecture for 3-manifolds, and simultaneously dramatically extended our understanding of many infinite groups.