Rigidity of polytopes, areas of polygons, and the Robbins conjectures

Igor Pak
University of Minnesota

Abstract: Some of the most classical mathematical questions ask about the volumes of polytopes given the edge lengths. In 1995, David Robbins published a series of conjectures on what he called the generalized Heron polynomials, giving the area of inscribed polygons. All these conjectures were recently proved using a mixture of tools from combinatorics and algebraic geometry. In this talk I will survey this work and spend much of my time outlining a deep connection with the rigidity of convex polytopes and the bellows conjecture on the volume of flexible polytopes (resolved by Sabitov).