# Dimension-free estimates for discrete maximal functions

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In the 1980s, mathematicians began to study dimension-free estimates of $L^p$ norms of the Hardy-Littlewood maximal operator in $\mathbb{R}^d$ over various sets. Fairly recently people began to consider similar problems for the discrete maximal function.

In the first part of the talk I will mention the most significant results in the discrete setup and compare them with continuous results. In the second part of the talk I will briefly explain the ideas behind the proofs and methods involved, as well as share with you why the discrete version of these problems is harder. At the end of the talk, I will mention my new results and share with you interesting discoveries regarding lattice points in high-dimensional Euclidean balls with small radii.

These problems, on the one hand require classical methods from harmonic analysis (e.g., Paley-Littlewood theory), but at the same time are related to counting lattice points in various high-dimensional objects.