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Title: Topological lower bounds on the sizes of simplicial complexes and regular simplicial sets.

Abstract: We are interested in the following question: given a topological space, what is the size of its smallest triangulation?
Here by "size" we mean the number of top-dimensional simplices.

In the 80s Barany and Lovasz proved that any centrally symmetric triangulation of the n-sphere has size at least 2^{n+1}. Equivalently, one needs at least 2^n simplices to triangulate the n-dimensional real projective space.

In this talk I will present a generalization of their result, which informally says that a space of "rich enough" topology cannot have a small triangulation (more generally, it cannot be homeomorphic or even homotopy equivalent to a small regular simplicial set).
One notable example of such "rich" space is the n-dimensional torus (S^1)^n for which, as it turns out, Barany and Lovasz result also holds.

This is a joint work with Roman Karasev.