

# TOPOLOGY OF LARGE RANDOM SPACES

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We study large random simplicial complexes (high-dimensional analogues of random graphs) and their topological and geometric properties. I will focus on a model involving several probability parameters describing the statistical properties of random complexes in various dimensions. The multi-parameter random simplicial complexes interpolate between the Linial-Meshulam random complexes and the clique complexes of random graphs. The Homological Domination Principle states that the Betti number in one specific dimension (the Critical Dimension), which depends on the probability multi-parameter, significantly dominates all other Betti numbers. Attempting to understand the general picture of properties of random simplicial complexes with a fixed critical dimension leads to some interesting conjectures, which I will discuss in my talk. I will also describe some results about the probabilistic treatment of the Whitehead Conjecture concerning aspherical 2-dimensional complexes.

This is a joint work with A. Costa.

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