

RANDOM (BETA) POLYTOPES

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This talk starts with an introduction to classical random polytope models in \mathbb{R}^d : random convex hulls generated by uniform random points in convex bodies or on their boundary. We discuss various asymptotic results for the missed volume. Similar questions are then discussed for random polytopes on the d -dimensional unit sphere, which are generated by n random points uniformly distributed in a spherically convex container set or on its boundary. In particular, we show how such a non-Euclidean model can be analysed by combining probabilistic tools with geometric estimates. Expanding the container set to a half-sphere gives rise to new phenomena and serves as our entrance card to the family of beta random polytopes. Their distinguished properties are discussed. We then present a selection of results demonstrating their central role in stochastic geometry, including random cones as well as random Voronoi tessellations.