# Maximal fluctuations of convex hull interfaces

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We consider the random polytope obtained as the convex hull of a random set of points which are independently and uniformly distributed in a smooth convex body $K$ of $d$-dimensional Euclidean space. We are interested in the maximal fluctuations of the boundary of the random polytope when the size of the random input tends to infinity. The maximal radial fluctuations, as measured by the rescaled Hausdorff distance between the random polytope and the body $K$, asymptotically follow a Gumbel extreme value distribution and have an explicit extremal index. Likewise, the maximal longitudinal fluctuations of the random polytope, as measured by the rescaled maximal facet areas, also converge to a Gumbel distribution. Surprisingly, the maximal fluctuation results resemble those of interfaces in general dynamic and equilibrium systems, including those arising in subcritical random cluster and bond percolation models, where one observes identical scaling, including the same logarithmic correction factors.

This talk is based on joint work with Pierre Calka.