BRUCE REED, McGill University, Montreal
On the diameter of a random Minimum Weight Spanning Tree

In first passage percolation, given random weights on the edges of a connected graph G, we are interested in the structure of the graph formed by the union of the lightest paths from some source s to every other vertex. A natural variant would be to consider the lightest graph containing a path between every pair of vertices (as we will see this makes sense even in the infinite setting). These objects arise naturally in computer science and network design and are called Minimum Weight Spanning Trees.

In such a tree, there is a unique path between every pair of vertices. We are interested in the maximum number of edges in such a path, which is known as the *diameter* of the tree. We consider weighting the edges of a complete graph (the mean field model) with i.i.d. weights, conditioning on the weights being distinct (a probability 1 event if our distribution has no point mass).

Amongst other results on its distribution, we show that for any weighting, the expected value of the diameter for the MWST on a complete graph with n vertices is between $c_1 n^{\frac{1}{3}}$ and $c_2 n^{\frac{1}{3}}$ for two constants c_1 and c_2.

This is joint work with Louigi Addario-Berry at end.