Random subgraphs

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Given a graph G and a real number $p \in [0,1]$, we can form a random subgraph G_p by keeping each edge of G independently with probability p. This general definition captures many classical notions, including the binomial random graph $G_{n,p}$ (which corresponds to the case $G = K_n$) and Bernoulli bond percolation (where G is an infinite transitive graph, such as the lattice $\mathbb{Z}^d$).

In this talk, I will present some new results on this random object, in which we assume essentially nothing about the graph G apart from its average degree d. In particular, I will discuss what happens around the critical probability $p \asymp 1/d$, discussing the emergence of complex structures such as large connected components and long cycles.

Based on joint works with subsets of Micha Christoph, Patryk Morawski, and Alp Müyesser.