ON SANDWICHES AND RANDOM REGULAR GRAPHS

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If you want a representative graph with a certain edge density, you can pick a graph at random according to the Erdős-Renyi (or binomial) random graph model. The likely properties of such a randomly selected graph have been well-understood for decades. If instead you require a specific degree distribution, you can randomly pick a graph from those with the specified degree distribution, but this is a lot harder to understand. The probabilities of edges being present are no longer independent, and finding the likely properties of such a graph has historically required much hard work, even in the special case where all degrees are equal (i.e., the graph is regular). In the case where all degrees are equal to some sufficiently large d, Kim and Vu observed that the random regular graph shares many properties with the Erdős-Renyi random graph, and conjectured that it is possible to 'sandwich' the random regular graph between two Erdős-Renyi random graphs with similar edge density. I will discuss our proof of this sandwich conjecture, which unifies many previously separate hard-won results. This is joint work with Richard Montgomery and Daniel Il'kovič.

This talk is intended to be a gentle introduction to this topic that will be accessible to all.