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Ramanujan graphs and gaps between primes

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The explicit construction of infinite families of d -regular graphs which are Ramanujan is only known in the case $d - 1$ is a prime power. In this talk, we consider the case when $d - 1$ is not a prime power. The main result is that by perturbing known Ramanujan graphs and using results about gaps between consecutive prime numbers, we are able to construct infinite families of “almost” Ramanujan graphs for almost every value of d (in the sense of natural density).

This is an exposition of joint work with Sebastian Cioaba.