

# Sidorenko Hypergraphs and Random Turán Numbers

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## Abstract

Let  $\text{ex}(G_{n,p}^r, F)$  denote the maximum number of edges in an  $F$ -free subgraph of the random  $r$ -uniform hypergraph  $G_{n,p}^r$ . Following recent work of Conlon, Lee, and Sidorenko, we prove non-trivial lower bounds on  $\text{ex}(G_{n,p}^r, F)$  whenever  $F$  is not Sidorenko. This connection between Sidorenko's conjecture and random Turán problems gives new lower bounds on  $\text{ex}(G_{n,p}^r, F)$  whenever  $F$  is not Sidorenko, and further allows us to bound how “far” from Sidorenko an  $r$ -graph  $F$  is whenever upper bounds for  $\text{ex}(G_{n,p}^r, F)$  are known. This is joint work with Jiayi Nie.