



# PROBABILITY AND INFORMATION THEORY SEMINAR

## Extremal combinatorics in sparse random settings

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**Abstract:**

The typical extremal problem asks how large a structure can be if it avoids some forbidden subsystem. For instance, in the field of graph theory, Mantel's theorem determines the triangle-free graphs with the most edges. In extremal set theory, the Erdős-Ko-Rado theorem describes the largest set families not containing a disjoint pair. In all of these settings, the structures are built from some deterministic ground set, be it the set of all edges between  $n$  vertices, or the collection of all  $k$ -subsets of some  $n$ -element set.

A recent trend in combinatorics has been to see how far these classic extremal results transfer to the sparse random setting, where the ground set is restricted to some randomly chosen subset. This direction of research was perhaps initiated by Babai, Simonovits and Spencer in 1990, who investigated the analogue of Mantel's theorem for the Erdős-Renyi random graph  $G(n, p)$ . Over the last few years, similar results have been obtained in extremal set theory.

In this talk, we shall provide a brief survey of this line of investigation. We shall then present some sharp results about a random version of the Erdős-Ko-Rado theorem, answering a question of Bollobás, Narayanan and Raigorodskii. This is joint work with Tuan Tran.

Date: August 21, 2015 (Friday)

Time: 2:00 – 3:00pm

Place: Room 210, Run Run Shaw Bldg., HKU