

Institut für Diskrete Mathematik

## Combinatorics Seminar

Friday 11th November 12:15 (Note : New time)

Online meeting (Webex)

# Distinguishing one community from many communities

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(Uppsala University)

We study the planted-dense-subgraph model where an Erdős–Rényi base graph is augmented by adding one or more ‘communities’ - subsets of vertices with a higher-than-average connection probability between them. The detection problem is to distinguish between the vanilla Erdős–Rényi model and that with one or many planted communities and the recovery problem is to approximately recover the position of the community structure within the graph. A detection-recovery gap is known to occur, for some parameter combinations (sizes of structure, edge probabilities), we have fast algorithms to perform detection but recovery is not possible. We investigate something in-between: we want to infer some property of the community structure without needing to recover it. We say counting is the problem of distinguishing a single community from many. Our result is to show counting is no easier than recovery in the low degree framework. The proof involves proving some properties of a recursively defined sequence indexed by graphs.

Joint work with Cynthia Rush, Alex Wein and Dana Yang.

Meeting link:

<https://tugraz.webex.com/tugraz/j.php?MTID=m44797227fd680cc7956ebb840b6f033a>

Meeting number: 2730 500 3129

Password: vQydpG372D4

Joshua Erde, Mihyun Kang, Michael Misethan