



# THE UNIVERSITY OF CHICAGO

Departments of Computer Science, Mathematics, Statistics, and the Computation Institute  
**SCIENTIFIC AND STATISTICAL COMPUTING SEMINAR**

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## Average Minimum Rank of a Graph

**THURSDAY, May 9, 2013, at 4:30 PM**

Eckhart 133, 5734 S. University Avenue

### ABSTRACT

The minimum rank of a simple graph  $G$  is defined to be the smallest possible rank over all real symmetric matrices whose  $u, v$  entry (for  $u \neq v$ ) is nonzero whenever  $uv$  is an edge in  $G$  and is zero otherwise.

This talk will give an introduction to the problem of determining the minimum rank of a graph and then focus on determination of the average minimum rank over all labeled graphs of order  $n$ . Bounds for the expected value of minimum rank of  $G(n, \frac{1}{2})$ , the usual Erdős-Rényi random graph on  $n$  vertices with edge probability  $\frac{1}{2}$  will be presented.

Connections between average minimum rank results, the  $\delta$ -conjecture and the Graph Complement Conjecture (GCC) will also be discussed. The  $\delta$ -conjecture involves an upper bound for minimum rank in terms of the difference of order and minimum degree; it appeared in a paper of Lovász, Saks, Schrijver in 1989. The GCC is that the sum of the minimum rank of a graph and the minimum rank of its complement is bounded above by the order of the graph plus two; this is a Nordhaus-Gaddum type problem for the graph parameter minimum rank.

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