Counting Problems on Lifts of Graphs

Date October 8

Time 3 pm

Location 303 Mudd

Abstract: The Ahlswede-Daykin "four functions" theorem provides an inequality for sums of products of independent functions that satisfy a certain ordering condition. This simple-to-prove combinatorial inequality has found many applications in statistical physics (e.g., the FKG inequality) and probability theory. Similar inequalities arise in the study of so-called "attractive" graphical models. In this talk, I will present the motivating application (approximating the partition function of the ferromagnetic Ising model) and proof idea for a new variant of the four functions theorem as well as some tantalizing open questions and conjectures related to these kinds of combinatorial inequalities.