Mathematics, Statistics, and Computer Science **@ UIC**

Combinatorics and Probability Seminar

The structure of Gibbs measures for high-density hard-core models in discrete 2D

Izabella Stuhl (Penn State)

Abstract: The hard-core/independent set model describes a system of non-overlapping identical hard spheres in a space or on a lattice. One of the outstanding open problems of statistical mechanics is: do hard disks in a plane exhibit a phase transition? It seems natural to approach this question by possible discrete approximations where disks must have the centers at sites of a lattice. Unlike most models in statistical physics, we find non-universality and connections to algebraic number theory, with different new phenomena arising in triangular, square lattices and in a hexagonal tiling.

We analyze the structure of Gibbs measures for large fugacities (i.e., high densities), intrinsically related to the disk-packing problem.

This is joint work with A. Mazel and Y. Suhov.

Monday, March 1 at 3:00 PM in Zoom