

Stanford Department of Mathematics Colloquium

February 3
4:15 p.m.
Bldg. 380, Room 380-W.

Random Matrix Combinatorics

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Abstract

Over the last half century mathematical physics has inspired the introduction of new analytic methods for studying problems in enumerative combinatorics and combinatorial geometry. A particular example of this is related to the theory of "maps" which was first introduced to study the four color problem although it soon took on a life of its own as a branch of combinatorial graph theory. In the early 1980's a group of physicists (including Bessis, Itzykson and Zuber) found a way to connect this area of study to random matrix asymptotics. More recently the introduction of powerful analytic methods in random matrix theory has led to a re-visitation of these combinatorial questions and the development of an area of study that one might refer to as random matrix combinatorics.

Most recently these studies have yielded the resolution of a number of decades old conjectures and provided a glimpse of possible new lines of investigation that bridge between combinatorics, probability theory and nonlinear analysis. In particular, ideas that grew out of integrable systems theory and near-integrable wave theory play a role here. This talk will motivate how these diverse viewpoints enter into these latest developments.