Randomness, Symmetry and Free Probability

Titles and abstracts

Wednesday 18 September 2019

Pevensey 1A6

9:45-10:45 Jon Warren (University of Warwick)

Random matrices and point to line last passage percolation

Abstract: The all-time supremum of a Brownian motion with negative drift is exponentially distributed. A generalization of this classical fact to random matrices is the statement that the supremum of the largest eigenvalue of a Hermitian Brownian motion with drift is equal in distribution to a certain function of several independent, exponentially distributed random variables. In fact this function is a point to line last passage time. I will discuss this result, and a finite temperature analogue which links exponential functionals of Brownian motion to the log gamma polymer, and which generalises Dufresnes identity. Based on joint work with Will Fitzgerald.

10:45-11:15 *Coffee break*

11:15-12:15 Mylène Maïda (University of Lille)

Large deviations of the largest eigenvalue of the sum of two random matrices

Abstract: Since the pioneering work of Voiculescu, it is known that free probability is a powerful tool to describe the global asymptotic behavior of the spectrum of the sum of two random matrices in generic position. More recently, it has been highlighted that free probability - for example through subordination functions - could also be useful to describe the typical behavior of extreme eigenvalues in such models. In this talk, we investigate the deviations of extreme eigenvalues in the same framework. This is based on a joint work with Alice Guionnet (CNRS, ENS Lyon).

12:15-13:45 LUNCH

13:45-14:45 Natasha Blitvic (University of Lancaster)

Probability through the looking-glass

Abstract: In this talk, we will explore the interplay between classical probability, free probability, and other non-commutative probabilistic frameworks through a unifying lens. We will draw on combinatorics, central limit theorems, and quantum harmonic oscillators to present familiar probabilistic ideas in perhaps a new light and to present some new developments in the area of non-commutative probability.

14:45-15:15 *Afternoon coffee break*

15:15-16:15 Antoine Dahlqvist (University of Sussex)

Recent progress for gauge theory on the two-dimensional torus.

Abstract: Euclidean lattice gauge theories were introduced and studied from the 70's by physicists and mathematicians as a theoretical mathematical model describing the fundamental interactions between elementary particles. From the late 80's to today, it appeared to be a nice playground for mathematicians and lead to natural questions in random matrix theory and random geometry. In this talk, I shall review progress made recently in two dimensions for different topologies, related to different Brownian bridges on unitary groups. As a new result, we prove in the case of the two-dimensional torus the almost sure convergence of Wilson loops. This is based on joint works with Thibaut Lemoine and Thierry Lévy (Paris, Sorbonne University).

7:00 Dinner in Brighton