Probability Seminar

Title: Universal universality breaking for random integer partitions

Speaker: Harriet Walsh (Angers)

Date: Wed 29th November 2023 at 3:00PM

Location: E0.32 (beside Pi restaurant)

Abstract: I will talk about a family of measures on integer partitions which are in one-to-one correspondence with models of random unitary matrices and lattice fermions (specifically, a case of Okounkov's Schur measures). Under these measures, in a limit in which the expected size of a partition goes to infinity, the first part of a partition generically exhibits the same universal asymptotic fluctuations as the largest eigenvalue of a GUE random Hermitian matrix. First, I'll describe how we can tune these measures to exhibit new edge fluctuations at a smaller scale, which naturally generalise the GUE edge behaviour. These new fluctuations are universal, having previously been found for trapped fermions, and when a measure is tuned to produce them, the corresponding unitary matrix model is 'multicritical'. Then, I'll show how the measures can escape these more general universality classes, when tuned so that a certain domain associated with them has several cuts. In this case, the breakdown in universality arises from an oscillation phenomenon analogous to one previously observed in multi-cut Hermitian matrix models. Moreover, we have a one-to-one correspondence with multi-cut unitary matrix models. This talk is partly based on joint work with Dan Betea and Jeremie Bouttier.