Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

April 10   **Felix Parraud**, KTH Royal Institute of Technology

Title: *Asymptotic expansions in Random Matrix Theory and application: the case of Haar unitary matrices.*

Recently we developed a method to compute so-called asymptotic expansions of certain quantities coming from Random Matrix Theory. More precisely if one considers the expectation of the trace of a sufficiently smooth function evaluated in a random matrix, one can compute a Taylor expansion (in the dimension of our random matrix) of this quantity. This method relies notably on free stochastic calculus whom we will briefly talk about. In a previous work we studied the case of GUE random matrices, in this talk we consider polynomials in independent Haar unitary matrices. We shall explain the additional difficulties that this model brings then we will finish the talk by giving a few applications of this result to Random Matrix Theory as well as links with Weingarten calculus.