



2011 Seminar Series

Dr. Alexandru Nica

Professor
Pure Mathematics Department
University of Waterloo

Friday, April 8, 2011

Time: 3:00 - 4:00 PM

Room: BSE 2.102

A survey of combinatorial methods in free probability

Abstract: Free random variables arise in noncommutative probability theory in connection to free products of operator algebras, but also as the $\mathbf{N} \rightarrow \infty$ limit for certain important ensembles of random $\mathbf{N} \times \mathbf{N}$ matrices. This talk will present a survey of how one can approach free random variables and make calculations with them from a combinatorial standpoint. The workhorse for all combinatorial considerations on free random variables is the lattice $\mathbf{NC}(\mathbf{n})$ of non-crossing partitions. I will illustrate some well-established techniques based on the Moebius inversion theory of $\mathbf{NC}(\mathbf{n})$, and then also look at two current directions of research in this area: one of them relates free probability with something called *Boolean noncommutative probability*, the other is about using Hopf algebra methods to study free multiplication.

A reception will follow the talk and will be held in BSE 2.102