Free probability seminar

Speaker: **Alexandru Nica**.
Affiliation: University of Waterloo.
Time and Place: Wednesday, **February 25**, 1:50-2:50 p.m., Milner 216.

Multi-variable subordination distributions for free additive convolution.

Free additive convolution $\boxplus$ is an operation with probability distributions on $\mathbb{R}$ which reflects the addition of freely independent random variables. A significant fact in its theory is that the Cauchy transform of $\mu \boxplus \nu$ is subordinated to those of μ and of ν, as analytic functions on the upper half-plane. The talk will explain how certain aspects of this subordination property (namely, those related to a "subordination distribution" of $\mu \boxplus \nu$ with respect to μ or to ν) can be extended to a multi-variable framework, where one looks at addition for freely independent k-tuples of selfadjoint elements in a C^*-probability space.

The main tools used for studying multi-variable subordination distributions are combinatorial properties of the R-transform, and a related operator model on the full Fock space. In the operator model approach, the subordination distribution is obtained by performing a simple extra step in the standard model for the R-transform of the free product $\mu * \nu$. In the combinatorial approach, one encounters a type of summation over lattices of non-crossing partitions which had been previously used in the theory of conditionally free random variables; it is interesting that several other occurrences of this type of summation have been found in the recent free probability literature.

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