Title: Berry–Esseen Bounds for random tensors.

Speaker: Konstantinos Tyros

Abstract: Let d, n be positive integers and let $\boldsymbol{X} = \langle X_i : i \in [n]^d \rangle$ be a symmetric and exchangeable random tensor with entries of bounded third moment that vanish on diagonal indices. We obtain estimates for the Kolmogorov distance to appropriately chosen gaussians, of linear functions $\sum_{i\in[n]^d} \theta_i X_i$ of the random tensor $\boldsymbol{X}$. Our approach requires the development of a combinatorial CLT for high-dimensional tensors which provides quantitative normality of statistics of the form $\sum_{(i_1,\dots,i_d)\in[n]^d} \boldsymbol{\zeta}\big(i_1,\dots,i_d,\pi(i_1),\dots,\pi(i_d)\big)$, where $\boldsymbol{\zeta}\colon [n]^d \times [n]^d \to \mathbb{R}$ is a deterministic real tensor, and π is a random permutation uniformly distributed on the symmetric group $\mathbb{S}_n$. The latter result extends classical work of Bolthausen, who covered the case $d = 1$, and more recent work of Barbour/Chen who treated the case $d = 2$. If time permits, we will see some applications of the above results. This is a joint work with P. Dodos.