

Submission for an invited session, organized by Afonso Bandeira

## Method of Moments using Implicit symmetric tensor decomposition

João Pereira<sup>1</sup>,

<sup>1</sup> UT Austin, Texas, USA

When analyzing a dataset, one of the first tools employed is PCA, which analyzes the first and second moment of the data (mean and covariance). However methods that use information from higher order moments are often disregarded, since these involve constructing tensors which occupy a lot of memory. Additionally, most tensor problems are NP-hard and algorithms for decomposing tensors are either lacking or not reliable. In this talk I will present a recently proposed algorithm for decomposing symmetric tensors, which not only is much faster than the state-of-the-art, it also enjoys a rich mathematical foundation. Moreover I'll talk on how to use this algorithm to decompose moment tensors implicitly, that is, extracting the relevant information directly from the samples without ever explicitly forming the moment tensors.