



THE UNIVERSITY OF  
**CHICAGO**

Department of Statistics

DISSERTATION PROPOSAL

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Tensor Multi-Clustering and Tensor Completion with Missing Fibers

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#### ABSTRACT

High-order tensors have gained much attention recently since many problems can be formulated as recovering a low-rank tensor; examples of application fields include neuroimaging, genomics, and recommendation systems. In this talk, we present two problems: multiway tensor clustering and tensor completion with missing fibers. In the first part, a fused version of orthogonal alternating least squares algorithm (Fused-Orth-ALS) is proposed to complete tensor factorization and clustering simultaneously. Algorithmic guarantees will be addressed in terms of recovering and clustering consistency for asymmetric tensor with perturbation. In the second part, we propose a two-step algorithm with inverse propensity score for tensor completion, for scenarios with missing fibers not at random. The error bound of tensor completion, its rate optimality and algorithm convergence guarantees will be provided. Lastly, we will show implementations of our methods on Human Connectome Project (HCP) and GTEx datasets.