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**Community Detection on Mixture Multi-layer  
Networks via Regularized Tensor Decomposition**

By

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**Date: 22 April, 2022 (Friday)**

**Time: ~~11:00am – 12:00noon~~ 11:30am – 12:30pm**

**Venue: [Zoom ID 920 0082 3966](#) (Passcode: STAT)**

***Abstract***

We study the problem of community detection in multi-layer networks, where pairs of nodes can be related in multiple modalities. We introduce a general framework, i.e., mixture multi-layer stochastic block model (MMSBM), which includes many earlier models as special cases. We propose a tensor-based algorithm (TWIST) to reveal both global/local memberships of nodes, and memberships of layers. We show that the TWIST procedure can accurately detect the communities with small misclassification error as the number of nodes and/or the number of layers increases. Numerical studies confirm our theoretical findings. To our best knowledge, this is the first systematic study on the mixture multi-layer networks using tensor decomposition. The method is applied to two real datasets: worldwide trading networks and malaria parasite genes networks, yielding new and interesting findings.

Based on joint work with Bing-Yi Jing, Ting Li and Zhongyuan Ly.

**All interested are welcome!**

**For details, please contact ISOM Department.**

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