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Department of Medicine  
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## Channing Network Science Seminar

Jan 16, 2015, 11am @ 5th floor conference room



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### **A unified data representation theory for network visualization, ordering and coarse-graining**

Abstract: Representation of large data sets became a key question of many scientific disciplines in the last decade. Several approaches for network visualization, data ordering and coarse-graining accomplished this goal. However, there was no underlying theoretical framework linking these problems. Here we show an elegant, information theoretic data representation approach as a unified solution of network visualization, data ordering and coarse-graining. The optimal representation is the hardest to distinguish from the original data matrix, measured by the relative entropy. The representation of network nodes as probability distributions provides an efficient visualization method and, in one dimension, an ordering of network nodes and edges. Coarse-grained representations of the input network enable both efficient data compression and hierarchical visualization to achieve high quality representations of larger data sets. In the end of the talk I briefly summarize the applications and extensions of the approach for node and edge ranking, as well as for community detection and block modeling.

Personal homepage with CV and list of publications: <http://people.bolyai.elte.hu/~steve3281/indexan.html>

Hosted by Yang-Yu Liu