



Keble College / University of Oxford



SEMINAR SERIES / Michaelmas 2013

For further information
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Seminar webpage:

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‘Weighted projected networks: mapping hypergraphs to networks’

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Tuesday 19th November, 12.30 -14.00
Roy Griffiths Room (ARCO), Keble College

ABSTRACT:

Many natural, technological, and social systems incorporate multiway interactions, yet are characterized and measured on the basis of weighted pairwise interactions. In this article, I propose a family of models in which pairwise interactions originate from multiway interactions, by starting from ensembles of hypergraphs and applying projections that generate ensembles of weighted projected networks. I calculate analytically the statistical properties of weighted projected networks, and suggest ways these could be used beyond theoretical studies. Projected weighted networks typically exhibit weight disorder along links even for very simple generating hypergraph ensembles. Also, as the size of a hypergraph changes, a signature of multiway interaction emerges on projected weighted networks that distinguishes them from fundamentally weighted pairwise networks. I find the percolation threshold and size of the largest component for hypergraphs of arbitrary uniform rank, translate the results into projected networks, and show that the transition is second order. This general approach to network formation has the potential to shed new light on our understanding of weighted networks.

