

Abstract Submitted
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Mesoscopic Structure in Complex Networks¹ JOERG REICHARDT, Complexity Sciences Center, UC Davis, ROBERTO ALAMINO, DAVID SAAD, NCRG, Aston University, Birmingham, UK — In a complex network, not all nodes are created equal. Rather, they play diverse roles in a network's function which in turn are reflected as patterns in its connectivity. Structural analysis allows to infer the latent roles and functions of nodes purely based on connectivity data. Current research on network structure is either focused at the macro-scale studying global network properties or at the micro level studying properties of individual nodes. The study of the meso-scale, which aims at studying joint properties of groups of nodes, so far has been limited to the detection of cohesive subgroups of nodes, so-called communities. The talk will show that, though important, communities are only one special case of a much wider class of mesoscopic structures called “stochastic block models” - after the salient block structure encountered when ordering rows and columns of the adjacency matrix according to the nodes' latent roles. We present an effective and accurate algorithm for latent role inference employing purely Bayesian approach, show that it outperforms competing approaches and present applications to real world data sets that open new frontiers of research in the study of both structure, function and evolution of complex networks from a mesoscopic perspective.

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