Title : **Uncovering the overlapping community structure of complex networks_in nature and society**

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Many complex systems in nature and society can be described in terms of networks capturing the intricate web of connections among the units they are made of. A fundamental question of great current interest is how to interpret the global organisation of such networks as the coexistence of their structural sub-units (communities) associated with more highly interconnected parts. Identifying these unknown building blocks (e.g., functionally related proteins, industrial sectors, groups of people) is crucial to the understanding of the structural and functional properties of networks. The existing deterministic methods used for large data sets find separated communities, while most of the actual networks are made of highly overlapping cohesive groups of nodes. Here we introduce an approach to analyse the main statistical features of the interwoven sets of overlapping communities making a much needed step towards the uncovering of the modular structure of complex systems.

After defining a set of new characteristic quantities for the statistics of communities, we apply an efficient technique to explore overlapping communities on a large scale. We find that overlaps are indeed very significant, and the distributions we introduce reveal novel universal features of networks. Our studies of collaboration, word association, and protein interaction graphs demonstrate that the web of communities has highly non-trivial correlations and specific scaling properties.

_*This works has been carried out in collaboration with G. Palla, I. Derenyi_and I. Farkas