Department of Network and Data Science | CENTRAL EUROPEAN UNIVERSITY

NETWORK CONTROL AND EMERGENT HIERARCHIES

A TALK BY

MÁRTON PÓSFAI

Postdoctoral Researcher, University of California

TUESDAY, MAR 19, **4:00 P.M.** | NÁDOR U. 11., **ROOM** 616

ABSTRACT | The field of network control aims to understand how network structure affects our ability to control complex systems. In the first half of my talk, I will provide a brief overview of the field and my contributions. To demonstrate how emergent phenomena affect control properties of networks, I will show how to connect controllability to core percolation, which is a structural phase transition of complex networks. I will identify open questions in network control and how my work can addresses these challenges. In the second half of the talk, I will introduce my recent work modeling emergent social hierarchies and using such models to understand a complex dataset describing interactions between members of rhesus macaque societies. Rhesus macaques live in cohesive hierarchically-structured groups, their social organization is regulated by a multiplex network of various affiliative and competitive interactions. A notable property of these groups is that they can become unstable: the hierarchical organization may collapse, culminating in large-scale fighting and dissolution of social order. I will extend models of hierarchy formation to include important features of social systems, thus revealing underlying mechanism that lead to social reorganization, as well as structural features of the multilayer social network that are associated with stable and unstable societies. Finally, connecting the two parts of my talk, I will discuss how rhesus macaque societies allow for the study of control of social networks in ways otherwise not possible for human networks.

BIO | Márton Pósfai received his PhD in statistical physics at the Eötvös University, Budapest under the supervision of Prof. Gábor Vattay. During his PhD he spent two years at Northeastern University, Boston in the lab of Prof. Albert-László Barabási and six months at TU Berlin in the group of Dr. Philipp Hövel. Currently, he is a postdoctoral researcher at the University of California, Davis working together with Prof. Raissa D'Souza. His research interests include network control, phase transitions in complex networks, modeling emergence and maintenance of social order, social organization of non-human primates, and networks of nonlinear oscillators.