

# NEW EMERGENT BEHAVIOR IN GENERALIZED NETWORKS



**A TALK BY**

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**ABSTRACT** | Networks constitute the backbone of many complex systems, on top of which collective behavior can emerge: from epileptic seizures in the human brain to the viral spread of rumours in a social network. When are simple network representations not enough? In this talk I introduce the topic of generalized networks, richer architectures which allow to consider the temporal and multiplex dimensions of relationships, and to go beyond simple pairwise interactions. Building on my contributions to the field, I focus on how to measure multiplexity in real-world systems from the micro to the macro scale, with examples from social, transportation and biological networks. I will then provide a short perspective on dynamical processes on generalized networks, searching for new emergent collective behavior and warning against overly optimistic statements associated to the multiplex, temporal and non-dyadic nature of interactions.

**BIO** | Federico is a Research Fellow at the Department of Network and Data Science at Central European University. Federico studies the structure and the dynamics of complex systems, using his background as statistical physicist (B.Sc. and M.Sc. from Sapienza University of Rome) to look into biological problems, model social systems, and find new solutions for the design of man-made networks. He holds a PhD in Applied Mathematics from Queen Mary University of London, where he was a member of the Complex Systems and Networks Group and worked under the supervision of Vito Latora as part of the EU-FP7 project LASAGNE on multilayer networks. Federico is an elected member of the council of the Complex Systems Society, the former Chair of the Young Researchers of the Society, and an alumnus of the Complex Systems Summer School in Santa Fe, New Mexico. Before joining DNDS, Federico held postdoctoral positions at the Brain & Spine Institute in Paris, and at the Department of Anthropology at University College London.