

2018 Seminar Series: New Frontiers in Systems Engineering


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Network modeling and network inference for prediction: From movie recommendations to strategic decision making

Abstract: In complex systems, such as cells or economies, individual components interact with each other through complex networks of interactions that are neither totally regular nor totally random. This makes understanding complex systems challenging but, at the same time, it means that each network contains, hidden within its structure, important cues about how the system operates and evolves. For the last 20 years researchers have developed tools and models to characterize such complex networks, but only relatively recently have we started developing models and inference techniques that enable us to make predictions about complex networks. In this talk I will discuss some of these approaches, especially those based on Bayesian inference with stochastic block models. I will also discuss how these methods can be applied to some important network problems (for example, identifying potentially dangerous drug interactions), as well as to problems that, a priori, may seem totally unrelated to networks (for example, developing efficient recommender systems or understanding how individuals make strategic decisions).

Bio: Roger Guimerà (Barcelona, 1976) is an ICREA Research Professor at the Department of Chemical Engineering, Universitat Rovira i Virgili. Dr. Guimerà graduated in Physics at Universitat de Barcelona in 1998, and obtained a PhD in Chemical Engineering from Universitat Rovira i Virgili in 2003. He then moved to Northwestern University where he worked as a postdoctoral fellow and, later, as a Fulbright Scholar. In 2008 he became a Research Assistant Professor at Northwestern's Department of Chemical and Biological Engineering, before accepting his current position at ICREA in 2010. He has been awarded the Premi Nacional de Recerca al Talent Jove (2010), the Erdős-Rényi Prize in Network Science (2012), and the Young Scientist Award for Socio- and Econophysics (2014).

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