1106-37-1304 **Per Sebastian Skardal*** (skardals@gmail.com), Department of Math and Comp Sci, Universitat Rovira i Virgili, Avinguda Paisos Catalans 26, 43007 Tarragona, Tarragona, Spain.

Optimal synchronization of complex networks.

Optimization of network synchronization is an important problem with applications to physics, biology, and engineering. In this talk I will consider networks of heterogeneous phase oscillators and derive a synchrony alignment function that can be readily optimized. I will demonstrate its utility with two examples: allocation of oscillators on a network and design of a network given a set of oscillators. In general synchronization is promoted by a strong alignment between the oscillators' frequencies and the dominant Laplacian eigenvectors. Optimized networks tend to have positive correlations between degrees and frequencies but negative correlations between neighboring frequencies. Interestingly, structural and dynamical heterogeneity complement one another: a more (less) heterogeneous network better synchronizes a more (less) heterogeneous set of oscillators.

I will complement these theoretical results with experiments of network-coupled electronic Rössler circuits tuned to the chaotic regime. Using this experimental setup, I will show that the mechanisms that promote synchronization in networks of phase oscillators extend to networks of chaotic oscillators.

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