



## The Nonlinear Small-Gain Theory for Networks and Control

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Dupuis Hall, Room 217*

The world is nonlinear and linked. Small-gain theory is one of the most important tools to tackle fundamentally challenging control problems for interconnected linear and nonlinear systems. In this talk, I will first review early developments in nonlinear small-gain theorems and associated nonlinear control design and show how it served as a basic tool to unify numerous results in constructive nonlinear control. Then, I will present recent developments in network/cyclic small-gain theorems for complex large-scale nonlinear systems, with a special focus on event-triggered control and feedback optimization. Finally, I will discuss briefly how machine learning techniques can be invoked to relax the conservativeness of small-gain designs, that falls into the emerging area of learning-based control, a new direction in control theory.