



**Department of Mathematics**

**Colloquium**  
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*Simulation and Control of High-dimensional  
Dynamical Systems*

**Abstract:** High-dimensional dynamical systems arise in a number of scientific fields, including engineering, biology, and medicine. Mathematical models of such systems can provide mechanistic insight into their dynamical properties and be used to design effective control strategies. In most real-world control problems, both control energy and cost constraints play a significant role. Although such optimal control problems can be formulated within the framework of variational calculus, their solution for complex systems is often analytically and computationally intractable. In this talk, we will discuss different control problems and ways to use artificial neural networks (ANNs) to learn near-optimal control functions. Different examples will illustrate that ANN controllers provide an effective and numerically stable tool to learn control solutions that are structurally similar to optimal ones.

**Wednesday April 24, 2024**

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**2:15 - 3:15 PM**

**Faculty Host: Maria D'Orsogna**

