



# THE UNIVERSITY OF CHICAGO

## COMPUTATIONAL AND APPLIED MATHEMATICS COLLOQUIUM

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IGOR MEZIC

Mechanical Engineering Department  
University of California Santa Barbara

### Koopman Operator Theory, Computation and Applications

THURSDAY, October 26, 2017, at 5:00 PM  
Jones 226, 5747 South Ellis Avenue

#### ABSTRACT

Recent progress in the operator-theoretic approach to dynamical systems has led to a growing set of applications in analysis of physical, biological, engineered and social systems. The methodology fits within what has been named a “data driven” approach. We start by discussing the fundamentals of the modern Koopman - or composition - operator theory and its relationship to geometric objects in state space, including the discussion of how these can be obtained from data. Computational methods, such as the Dynamic Mode Decomposition, and their convergence - in spectrum - to the Koopman operator will be discussed. Extensions to random dynamical systems and the associated noisy dynamic data streams will be given. Applications to fluid mechanics, combustion, traffic, and power grid dynamics will be used illustrate the theoretical, computational and data analytics concepts.

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CAM Colloquium URL: <https://cam.uchicago.edu/seminars/colloq/index.shtml>.

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