

# Perspectives on Quantifying Uncertain Mechanisms in Dynamical Systems

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Due to lack of scientific understanding, some mechanisms are not always well-represented in mathematical models for complex systems. The impact of these (e.g., uncertain, microscopic) mechanisms on the overall system evolution may be delicate or even profound. It is desirable to examine how these mechanisms affect the system at the macroscopic level, since we are often interested in macroscopic dynamics.

The speaker presents an overview of several available analytical and computational techniques for extracting macroscopic dynamics, while taking uncertain mechanisms into account. The issues include ensemble averaging of fluctuating driving forces on boundary, dynamical averaging of random hybrid mechanisms, and data-driven quantification of uncertain mechanisms in water vapor dynamics.