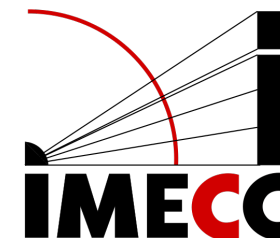




Workshop on Stochastic Analysis

IMECC - Unicamp

From August 10th to 13th, 2026



Alexei A. Mailybaev
(IMPA)

Spontaneous Stochasticity: Randomness Without Noise

Abstract

Spontaneous stochasticity is the phenomenon whereby a deterministic dynamical system develops intrinsically random trajectories in a singular limit, despite the vanishing of all external noise. Originally discovered in turbulence theory, it has emerged as a fundamental mechanism connecting chaotic multiscale dynamics, stochastic processes, and singular limits. I will present the basic ideas of spontaneous stochasticity through a simple multiscale model based on Arnold's cat map. I will then discuss examples arising in shell models of turbulence and fluctuating Navier-Stokes equations, and briefly comment on the associated renormalization-group perspective.