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SIPo (Seminario de Investigadores Postdoctorales)

Speaker: Nicolás Zalduendo (CMM)

Title: Central limit theorems for strcutured branching processes

Abstract:

Branching processes are mathematical models for populations that evolve by random reproduction: each individual lives for some time and then gives birth to new individuals, whose lives and offspring evolve independently. When such systems are enriched with spatial or structural information—allowing individuals to move, interact, or carry traits—they form infinite-dimensional stochastic processes that capture a wide range of phenomena, from cell division to particle systems.

In this talk, I will discuss recent results on the central limit theorem (CLT) for a large class of such structured branching processes. Roughly speaking, the CLT describes how the random fluctuations around the average exponential growth of the population become Gaussian in the long run. I will first revisit the classical finite-dimensional case to build intuition, and then explain how the same ideas extend to spatially dependent and non-local models. The main novelty is that, by combining probabilistic and analytic techniques—most notably Stein's method—we can not only prove convergence but also quantify the speed at which it happens.

Date and time : Thursday, October 7, at 2pm
Venue: Sala de Seminario Jonh Von Neumann, 7th floor.