



Departamento de  
Estadística e  
Investigación Operativa

## CICLO DE CONFERENCIAS ESTADÍSTICA Y CIENCIA DE DATOS PATRICIA ROMÁN

13/05/2026

**Título: From Growth to Collapse: Modeling  
Population Dynamics via Lognormal  
diffusions processes with random  
catastrophes.**

**Fecha y hora:** 22 de mayo del 2026 (11.30  
horas).

**Lugar (CAMBIO por obras): Sala de  
Conferencias del IMAG, UGR.**

**Conferenciante:** Sabina Musto (PhD student at  
Università degli Studi di Salerno).



**Resumen:**

Stochastic growth models and sigmoidal dynamics are essential tools for describing patterns that frequently arise in natural systems. They are widely used in biology and ecology to represent mechanisms such as population development, disease spread, and adaptive responses to environmental fluctuations. In this work, we investigate a lognormal diffusion process subject to random catastrophic events, modeled as sudden jumps that reset the system to a new random state.

The novelty of the model lies in the assumption that the post-catastrophe restart level follows a binomial distribution. As a consequence, after each catastrophic event the population does not simply revert to its initial size, but instead to a random level reflecting the survival probability of individual members. We apply this framework to the dynamics of a wolf population exposed to external disturbances. The findings show that the model can realistically reproduce complex population trajectories, displaying periods of gradual growth interspersed with sudden declines triggered by unpredictable external shocks.

La conferencia **se emitirá en directo** en el canal de youtube del departamento:  
<https://www.youtube.com/live/Y98XoVnilzQ>

**Breve reseña del conferenciante:**

Sabina Musto (PhD student at Università degli Studi di Salerno).