

# THE CRM APPLIED MATHEMATICAL PHYSICS (CAMP) SEMINARS



CENTRE DE RECERCA MATEMÀTICA

Rubén Pérez Carrasco

*Department of Mathematics, UCL*

## **Intrinsic noise profoundly alters the dynamics and steady state of morphogen-controlled bistable genetic switches**

### **Abstract:**

Bistable switches are a common regulatory motif in biological processes. In developing tissues, they are often controlled by gradients of secreted signalling molecules - morphogens -, providing a mechanism to convert a signalling gradient into stripes of gene expression that determine the arrangement of distinct cell types. In this talk I will analyze the temporal response of such a system focusing on the role of intrinsic fluctuations that result from the stochastic nature of gene expression. To tackle this problem I will make use of different approximations, using Gillespie simulations, Langevin equations and Minimum Action Path theory. The results reveal that noise induces a switching wave that propels the stripe boundary away from the morphogen source, eventually settling at a steady state different from the deterministic description.

**Date:** Sep 13, 2016

**Place:** Room C1/028

**Time:** 12:00

