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NOV.
2014

de 11h à 12h

SÉMINAIRE

Emergence of global patterns in bacterial growth: from single cells to communities

Serena Bradde
Initiative for the Theoretical Sciences, Graduate Center at CUNY, NY

Understanding how phenomenological behaviors observed in biological systems emerge from molecular interactions of many individual unit and how these interactions shape the response of living systems to a changing environment are challenging questions which lie at the interface between multiple disciplines. In this talk I will draw an example from the human gut microbiome, the full consortium of microbes living in association with the human gut. Recent developments in DNA sequencing have made it possible to monitor how the compositions of microbial species change in time. Analysis of healthy adults under antibiotic treatment showed that the gut microbiota could take several weeks to recover after treatment cessation. This suggests that the combination of inter-species and host-microbe interactions and external perturbations could lead to hysteresis phenomena. We investigate this possibility and propose an out of equilibrium stochastic model able to explain this phenomenon. Our study reveals the importance of noise-activated dynamics in the recovery from antibiotic-perturbed states.