

Les mardis de
L'IAB

MARCO RUSCONE

Barcelona Supercomputing Center, Spain

**MULTISCALE MECHANISTIC MODELING AS
A COMPANION FOR EXPERIMENTAL
BIOLOGY**

28.OCTOBER 2025 – 11 AM – LECTURE HALL

Multiscale models offer a powerful approach to studying complex biological processes across multiple spatial and temporal scales. They capture both intracellular dynamics—such as signaling regulation—and extracellular interactions, where cells communicate and coordinate their behavior. By revealing how genetic or environmental perturbations affect disease progression, these models can help identify strategies to restore healthy phenotypes.

In this talk, I will present some models developed using the *PhysiBoSS* framework, a physics-based cell simulator that integrates continuous-time Boolean models within an agent-based approach. These models address various aspects of cancer biology, including cell cycle regulation and invasion through the extracellular matrix, and have been used in close collaboration with experimental researchers to explore phenomena such as migration modes and tubulogenesis.

Finally, I will discuss how experimental biologists can benefit from partnering with computational modelers, illustrating how mechanistic modeling not only supports prediction and hypothesis generation but also opens new perspectives for interpreting biological complexity. I will also highlight how recent advances in artificial intelligence are making such modeling approaches increasingly accessible to experimental scientists—for instance, through conversational interfaces that allow users to build and explore simulations by interacting directly with an AI companion.

Invited by : Olivier Destaing

 Twitter : IAB_Officiel
Website : <https://iab-grenoble.fr/>