WPI-PRIMe Omnibus Seminar
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IPR Seminar "BioSim Talk #14"

# Multiscale Modeling in Cancer Research: Integrating Spatial Dynamics and Intracellular Regulation with Agent-Based and Boolean Network Approaches

Onsite Only


**Dr. Marco Ruscone**

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Life Science Department



## Abstract

Multiscale models provide a powerful means of studying complex biological processes across multiple spatial and temporal scales. They capture both intracellular events—such as signaling—and extracellular interactions, where cells communicate and coordinate. By revealing how genetic or environmental deregulation affects disease progression, these models can suggest strategies to restore healthy phenotypes.

In this talk, I will present a series of models developed using the PhysiBoSS framework, an extension of PhysiCell that integrates continuous-time Boolean models in an agent-based approach. These models address various aspects of cancer biology, including cell cycle regulation, invasion through the extracellular matrix, and T cell differentiation in response to dendritic cell contact. In particular, this invasion model reproduces findings from three distinct in vitro experiments, providing insights into epithelial-to-mesenchymal transition (EMT) and diverse invasion patterns.


## Biography

Marco Ruscone is a postdoctoral researcher in the Life Science Department, coordinated by Professor Alfonso Valencia, at the Barcelona Supercomputing Center (BSC). He began his academic career in Turin, Italy, earning a bachelor's degree in Physics and a master's degree in Physics of Complex Systems for Biology from the Università degli Studi di Torino. He completed his PhD in Computational Biology at the Institut Curie in Paris, under the mentorship of Dr. Laurence Calzone, Dr. Andrei Zinovyev, and Dr. Vincent Noël. His research centers on developing multiscale models for cancer, employing a hybrid approach that combines agent-based modeling techniques and stochastic simulations on Boolean networks.

## Venue

**Lecture Building, Lecture Hall A**
**（大阪大学医学部医学科講義棟 1階 A講堂）**

## Date & Time

**3/3 (Mon) 4:00 ▸ 5:00pm**
**(5:00 ▸ 5:15pm Networking)**

## Eligibility for Participation

*A credit seminar for the Graduate school of Medicine.

Registration form

https://forms.gle/k9H5L2ashicnCQYq8

Registration is not required, but please register so that we can count the number of expected participants.


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