PhD GRANTS 2024

PhD project title: Spatiotemporal Dynamics and Plasticity Mechanisms in Cancer Cell Populations

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PhD project summary (max. 20 lines):

The development and regeneration of tissues, whether healthy or tumorous, result from the coordinated action of processes such as proliferation, differentiation, motility, and cellular communication. In this context, our project investigates the capabilities of cancer stem cells to form niches and regenerate heterogeneous tumors. To achieve this, the project aims to integrate approaches involving (1) microscopy for spatiotemporal tracking of breast cancer cell populations, (2) inference of a stochastic nonlinear model of phenotypic plasticity, and (3) inference of a regulatory network based on high-throughput transcriptomic data. The main methodological challenge is notably to characterize the complex landscape of phenotypic dynamics by distinguishing the contributions of intracellular and intercellular communication and of cellular noise, using the formalism of generalized Langevin equations. This interdisciplinary project will leverage complementary tools and expertise with the goal of refining theoretical and experimental models of cancer stem cell plasticity, specifically, and the spatiotemporal dynamics of multicellular tissues in general.