Invited speaker of GFR 2024

Probing biological tissues rheology through heterogeneous tissue flows in 2D cell monolayers and 3D organoids

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Understanding how cells deform and exchange neighbors under mechanical constraints is crucial for deciphering dynamic changes in biological tissues. These mechanical interactions are pivotal in processes such as organ morphogenesis during embryonic development, the formation of organoids in vitro, and cancer progression. A significant challenge in studying spontaneously developing tissues lies in the limited understanding of both the active stresses generated by biological activity and the local rheological properties of tissues. In this talk, I will present experiments on two systems: 2D cell monolayers undergoing collective migration on adhesive substrates and 3D cell organoids subjected to microfluidic constriction. In both cases, tissues experience heterogeneous flows that drive cell deformation and neighbor exchange. I will discuss how combining microscopy with image analysis enables us to probe the mechanical behavior of these tissues.