Control and self-organization of tissue morphogenesis

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Epithelial tissues exhibit a remarkable dual property of robustness and fluidity. This manifests on different time and length scales and relies on unique mechanical properties of the cell cortex and on adhesive interactions between cells. We seek to understand the fundamental molecular mechanisms responsible for this property.
To that end we develop a range of approaches, from the genetic and pharmacological perturbations of molecular components, the quantitative imaging of proteins using a variety of photonic methods, probing of the physical properties of cells within intact tissues, and computational modelling of morphogenesis at different scales.
I will present our recent progress in understanding how cellular and tissue scale active stresses drive the dynamic remodelling of cell contacts and a rich repertoire of tissue morphogenetic processes.
I will document how morphogenesis emerges from mechano-chemical information operating both as a program and in a self-organised manner.