

Associated researcher: Manuel Arroyo
Co-supervisor: Xavier Trepap

Reverse engineering epithelial remodeling and morphogenesis

The ability of tissues to remodel is critical during development, adult life and disease. Epithelial monolayers in an embryo, for example, undergo extreme reconfigurations, in which cells change shape, flow within the plane, and remodel in three-dimensions. Epithelial cultures in vitro have the ability to spontaneously mimic many of these events. In the present project, the goal is to actively control (in contrast with spontaneous self-assembly) the in-plane and three-dimensional configuration of epithelial monolayers, with the underlying assumption that controlling epithelial morphogenesis will allow us to better understand it. This will involve tools of cell biology (optogenetics), materials engineering (strain engineering, gel microfabrication), and modeling (soft/active matter physics, mechanics of materials).

