

Cellular morphodynamics

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The motility of cells is governed by a complex machinery operating at the molecular scale, eventually translating local mechanical forces into whole-cell deformation. Here we present a computer vision based approach using biophysical optical flow methods to extract dense maps of internal pressure and forces directly from live cell imaging data. This is achieved by mapping the motion of fluorescently labelled intracellular structures with a fluid dynamics model of the cellular material, using image analysis, physical modelling and mathematical optimization techniques.