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"la Caixa" Fellowship Programme with
a set of **stimulating PhD projects** and
excellent research groups
to host the fellows



Integrative cell and tissue dynamics group

Group leader: Xavier Trepap

Mechanobiology of tumour-stroma interactions

Cancer progression is increasingly attributed to the aberrant interaction between cancer cells and their surrounding microenvironment. Non-malignant cell types within this microenvironment can be reprogrammed by cancer cells to perform functions that are otherwise poorly efficient or altogether unavailable to the tumour.

The project will rely on novel technologies developed in our laboratory including optogenetics probes and rigidity gradients (Bazellières et al, Nature Cell Biology, 2015; Sunyer et al, Science, 2016). The study will be carried out in collaboration with Dr Erik Sahai (Crick Institute, UK) and local clinical groups.

Recent group publications:

1. Sunyer R, ..., Trepap X. Collective cell durotaxis emerges from long-range intercellular force transmission. *Science* (2016).
2. Casares L, ..., Trepap X. Hydraulic fracture during epithelial stretching. *Nature Materials* (2015).
3. Bazellières E, ..., Trepap X. Control of cell-cell forces and collective cell dynamics by the intercellular adhesome. *Nature Cell Biology* (2015).
4. Brugués A, ..., Trepap X. Forces driving epithelial wound healing. *Nature Physics* (2014).

Job position description

The goal of this PhD thesis is to study the mechanobiology of the interaction between cancer cells and stromal cells. To reach this goal, the student will implement new 3D co-culture systems to analyse the interplay between cancer cells, fibroblasts, and macrophages obtained from patients with epidermal, lung and colorectal cancer.

The student will combine tools in life cell microscopy, force microscopy, cell and molecular biology, and 3D bioprinting.

Candidates should have a background in Physics, Chemistry, Engineering, Biology, or Biomedical sciences.