

## **INTERNSHIP PROPOSAL**

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Internship location:	Laboratoire MSC – Batiment Condorcet 10 rue Alice Domont et Léonie Duquet 75013 PARIS
Thesis possibility after internship:	YES

### **Mechanobiology of tumor invasiveness**

Primordial cell functions such as cell division, migration and adhesion are deeply affected in tumor cells. All these processes are directly related with cell mechanics. From the past decades this conclusion drives the emergence of numerous studies on single tumor cells. It sheds light on the importance of mechanical properties modifications in epithelia-mesenchymal transition and tumor progression. Diagnose tumors from the analysis of mechanical properties appears as an appealing candidate for cancer screening, palpation is already a clinical first clue of solid cancer detection.

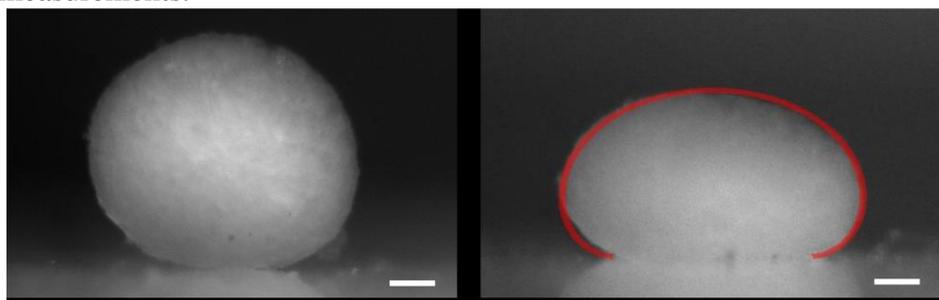
Understanding the impact of individual cell changes at the tissue scale is however still at stake. A solid tumor indeed reveals as being more rigid than healthy tissues while single tumor cells are actually softer than normal ones.

The internship will aim at answering two fundamental questions:

- how to explain mechanical properties of tissues? What is the role of extracellular matrix and collective 3D aspects on tumor mechanics?
- Could mechanical properties be considered as a diagnosis tool to predict the invasiveness potential of tumors?

By measuring the dynamics of multicellular aggregates deformations, we will focus on alteration of mechanical properties on a cell model of breast tumoral progression. The project is interdisciplinary and will be done in close collaboration with a biomedical team.

It will use several technics from magnetic nanoparticles incorporation to 2-photons imaging and force measurements.



**Figure 1 Magnetic multicellular aggregate deformed by the application of a magnetic field.**

F. Mazuel et al. [10.1103/PhysRevLett.114.098105](https://doi.org/10.1103/PhysRevLett.114.098105)

V. Du et al. [10.1038/s41467-017-00543-2](https://doi.org/10.1038/s41467-017-00543-2)

G. Mary et al. [10.21203/rs.3.rs-130138/v1](https://doi.org/10.21203/rs.3.rs-130138/v1)

Lodilinsky et al. [10.1038/s41388-021-01826-1](https://doi.org/10.1038/s41388-021-01826-1)