# Doctoral position 2019

## Thesis supervisor.

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**Thesis topic:** Cell elasticity probe by picosecond approach.

The ability of biological cells to interact with the extracellular microenvironment, *ie* extracellular objects or other cells, plays a critical role in several fundamental biological processes. In the case of tumors, the increase in rigidity could be related to various factors, including an increase in the modulus of elasticity of transformed cells due to cellular disturbances.
The vast majority of conventional methods of measuring the local mechanical properties of cells is based on the use of probes, such as AFM, and the measured mechanical properties are strongly depending on the contact/adhesion between the probe and the cell. This can sometimes be a major obstacle to the studies because the kinetic aspects of the adhesion between the probe and the target can disturb the measurements. However, acoustic waves generated by lasers provide a tool for probing the mechanical properties of biological cells or tissues in a non-contact, non-invasive configuration.
The aim of this thesis will be to investigate neuron elasticity an adhesion using pump and probe spectroscopy. The PC12 cells constitute a standard model for the analysis of adhesion and neuronal differentiation, but other systems will be considered.
Using a set up that has already proven itself we plan to investigate elasticity and adhesion behavior in in-vitro conditions under different parameters as applied field, chemical surface preparation.. This work will be based on time and space mapping at micrometer and picosecond time scale.

**Type of thesis:** Experimental. In collaboration with LCMCP at SU.

**Sources of funding available:** Ecole doctorale