Christele ETCHEGARAY.

In this talk, we are interested in the dynamics of cells circulating in the blood flow, such as leukocytes during the immune response, and tumor cells during the metastatic process. In particular, we focus on the interplay between the blood flow carrying the cell and the adhesive interaction arising between the cell and the vascular wall.
We formulate a stochastic model for the formation of adhesive bonds between the cell and the wall, that nonlinearly depends on the cell velocity: the faster it goes, the more likely existing bonds disassemble. We justify different scaling limits towards deterministic or stochastic problems, that we analyze. It leads to the identification of a shear-velocity threshold for the cell firm adhesion to the wall, and to the expression of its mean stopping time. Finally, comparison with in vivo biological data will be discussed.