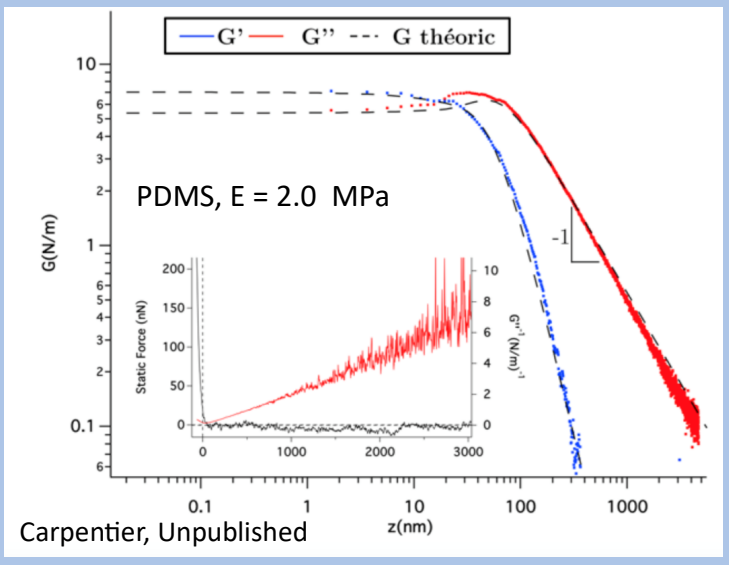
PHD SEMINAR

13/04/18 - 16H - CONF ROOM

• First Speaker : Erik Abegg

Non-contact determination of the mechanical properties of soft condensed matter using AFM

Precise determination of the elastic properties of soft condensed matter at the nanoscale is important in many situations, from substrate characterization to cancer cell differentiation. When measuring these properties at these small length scales through contact mechanics, adhesive effects dominate the interaction dynamics and prevent obtaining quantitative results. As a solution to this problem, a non-contact measuring mode has previously been developed for the surface force apparatus (SFA). The aim of my thesis is to move this technique to the AFM platform.



Carpentier, Unpublished

• Second speaker : Mehdi Inglebert

Microvasculature on a chip

Microvasculatures-on-a-chip, i.e. in vitro models that mimic important features of microvessel networks, have gained increasing interest in recent years. Such devices have allowed investigating cells morphology in 3D narrow channels and their biochemical response to flow shear stress in control and pathophysiological condition. It has been shown that shear stress induces morphological and biochemical changes when cells go from static to flow conditions. Indeed, the cytoskeleton is reorganized, adhesion patches move toward cell junctions, intercellular junction moves downward, close to the basal membrane and the glycocalyx, a glycosaminoglycans-rich surface layer exposed to blood flow, is synthetized. Still, central questions remain regarding the importance of the tri-dimensional organization of cells on their substrate. Here, we first focus on describing the phenotype of 3D cultured cells in physiological condition or when shear stress sensing is altered by enzymatic degradation of the glycocalyx, which plays a crucial role in regulating interactions between circulating cells and the endothelium and its biochemical response to changes in hemodynamics. We use confocal microscopy to characterize the surface layer expressed by endothelial cells and the structure of their cytoskeleton when cultured in microfluidic channels.