

## PhD position opening

### Mechanical characterization of cells and applications to platelet production

Starting date : October 1st

University : Université de Technologie de Compiègne

Research team : Biomechanics and Bioengineering (BMBI, UMR 7338 CNRS / UTC)

web site: <http://www.utc.fr/bmbi/>

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#### Context

Blood platelets are small anucleated cells responsible for the healing of wounds. Several therapeutic conditions require platelet transfusion. Platelet concentrates for transfusion are usually obtained by donation but may be prepared ex vivo by culturing hematopoietic stem cells and differentiating them into megakaryocytes (MK). When placed in a flow chamber and exposed to shear, mature megakaryocytes deform and break up into platelets. This phenomenon is yet to be studied in order to better simulate MK in bioreactors.



#### Objectives

The goal of this project is to study the biomechanics of MK rupture and platelet production at the scale of the individual cell. We will seek the conditions (hydrodynamics forces and surface treatment) promoting platelet release from MK. We will develop microfluidic tools to characterize the mechanical properties of MK, separate them according to their rigidity and evaluate the ability of each subpopulation to yield platelets in a bioreactor. This might provide us with a biomechanical tool to assess MK maturity.

**Key words** microfluidics, biomechanics, blood, cell

#### Integration in the research laboratory

The project will be hosted by the laboratory of Biomechanics and Bioengineering (BMBI) in Compiègne. BMBI is specialized in the multi-scale study of living systems : body, organs, tissues, cells and molecules. This approach is devoted to understanding the mechanisms of living systems as well as developing therapeutical and diagnostic tools.

The PhD student will have access to BMBI platforms for cell biology (cell culture equipment) and microfluidics (inverted microscope, high speed camera, microfabrication facilities as well as pumps and pressure controllers).

Collaborations : Dominique Baruch & Sonia Chassac (INSERM S\_1140, faculté de pharmacie, université Paris Descartes), Mathilde Reyssat (Gulliver, ESPCI)

#### Candidate profile

The candidate should have a masters degree in a relevant area of science (e.g Fluid Mechanics, Bioengineering, Biophysics) as well as a previous experience in experimental research. No prior knowledge of biology is required, but the candidate should be willing to work in team in an interdisciplinary context. Fluent English is required.