



TÉCNICO
LISBOA



Computational Modelling of Elastic Cells with Nucleus

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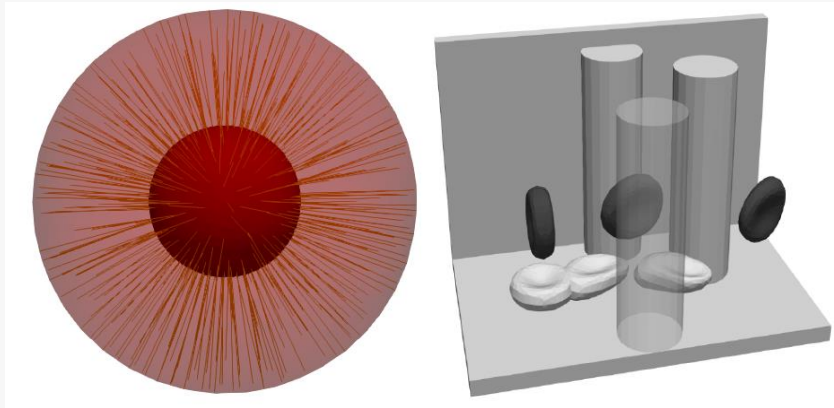
Motivation and Context

CELL-IN-FLUID

- Modelling elastic objects immersed in fluid (such as RBC in blood flow)
- Development of open-source software package Object-in-Fluid for ESPResSo
- My research focuses on adding cells with nucleus

Motivation

- Microfluidic devices can be used to detect cancer cell
- Improving the design of these devices through simulations
- Early diagnosis – individualized treatment, better prognosis



<http://espressomd.org/wordpress/>
<http://cellinfluid.fri.uniza.sk/>

Objectives

Verification

- Comparison between the simulation and biological data
- First to calibrate the model to mimic the behavior of the biological cell
- Afterwards the calibrated model could be used to optimize design of a microfluidic device

First steps

- Learning basics about obtaining data from the experiments
- Fluid flow information seems to be a challenge, possibly using MicroPIV
- Depending on the quality of data gathered from experiments, possibly modelling the available microparticles and surfactant,
- Obtaining data of cell deformation when cell pass through hyperbolic channels
- Modelling these cells