

Proposal for an interdisciplinary M2 internship in cell biophysics and diagnostic

Intracellular Nanorheology by molecular rotors Application to red blood cell pathologies

Keywords: red blood cells, molecular rotors, nanorheology, sickle-cell anemia, diagnostic

Where: Laboratoire Matière et Systèmes Complexes, UMR7057 CNRS & Université Paris Cité

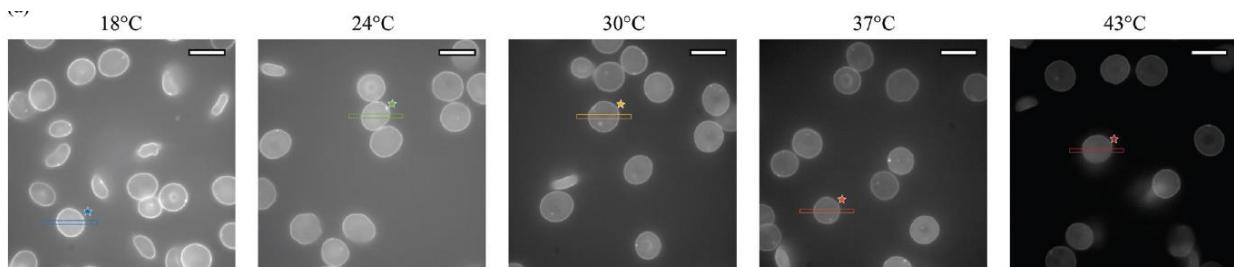
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Join our exciting project at the interface of physics, biology and clinic, in the context of sickle cell disease, the most common genetic disorder in France that alters the deformability of red blood cells.

This project is to further investigate the relevance of intracellular nanorheology, an innovative technique based on the use of molecular rotors, as a new rheological biomarker to facilitate patient monitoring for blood diseases affecting red blood cell stiffness. This research consists of both physics and biophysics developments, as well as proof of concept and investigations of nanorheology by molecular rotors on healthy and pathological blood.

You will be based at 'Matière et Systèmes Complexes', and will work in collaboration with the 'Biologie Intégrée du Globule Rouge' laboratory (UMR_S 1134 CNRS & INSERM). Our team at MSC has particular expertise in rheology and micro-rheology of complex and biological fluids, and the BIGR laboratory is specialist in red blood cell pathologies, essentially sickle cell disease. You will have the opportunity to work in a stimulating interdisciplinary environment.



Images of red blood cells incubated with the DASPI molecular rotor, with increasing temperature (scale bar: 10 µm). The rotor fluorescence signal increases with RBC rigidity with decreasing temperature.

Candidate background – You have strong motivation for cell experiments, bio-imaging and instrumentation. A good background in Physics or biological physics would be appreciated. You enjoy working in interdisciplinary projects, with good communication and synthesis skills.

To apply, **please send a CV** with motivation letter to Dr. Bérengère Abou : berengere.abou@u-paris.fr.

- A. Briole, T. Podgorski & B. Abou, Molecular rotors as intracellular probes of red blood cells rigidity, *Soft Matter* **17**, 4525 (2021).
- A. Briole & B. Abou, Molecular rotors in BSA and Hb protein solutions, submitted to *J. Roy. Soc. Interface* (2022).