

Team: Membranes and Cellular Functions

Single-molecule biophysics of active membrane proteins & emergent functionality

Supervisors: Raju Regmi, Patricia Bassereau

Webpage: <https://curie.fr/equipe/bassereau>

Lab address: 11 Rue Pierre et Marie Curie, Paris 75005

Contact: raju.regmi@curie.fr, patricia.bassereau@curie.fr

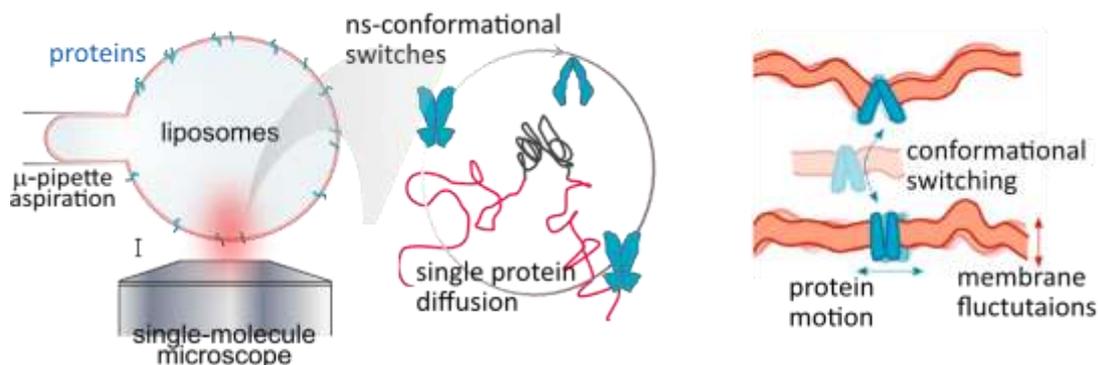
Keywords: single-molecule FRET, single-particle tracking, protein-protein interactions, clustering

M2 internships with possibility of PhD/s

Conformational changes and diffusion dynamics of membrane proteins are key in regulating fundamental cell physiology. Membrane proteins are involved in the transport of ions, drugs or molecules across the lipid bilayer using different sources of energy – during which they undergo specific conformations & spatial re-arrangement in membranes. **We are interested in deciphering non-equilibrium nanoscale conformations and membrane organizing principles of cell-signaling receptors and membrane transporter proteins.** In this thematic, we have multiple openings to address biophysics question such as:

- How do mechanical stresses on bio membranes affect protein conformations and thus its activity?
- How/whether does non-equilibrium activity mediate protein clustering and how it depends on mechanical stresses on the membrane?
- How does protein-protein interaction at the molecule level play a role in decision making at the cellular level?

For nano- and micromanipulation of lipids and proteins, we employ **transdisciplinary approach** combining biochemistry, synthetic biology, and **advanced optical** methods (single-molecule FRET, single particle tracking, fluorescence cross-correlation spectroscopy) **to explore the influence of conformations and protein-protein interactions in cell functions.** If any of these keywords interest you, and if you like working at the interface of physics and biology, please get in touch.



Key references:

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- Srinivasan, S., Regmi, R., et al. "Ligand-induced transmembrane conformational coupling in monomeric EGFR." [Nature Comm](https://doi.org/10.1038/s41467-022-28111-1), 2022.
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