



Acting Unit Deputy Director
Axel Buguin

Open internship positions are available on teams websites.

The goal of the unit is to uncover the role of physical laws in the architecture and functions of cellular systems. To this end, the teams follow cross-disciplinary approaches involving physics, chemistry and biology.

Studies cover a breadth of topics ranging from single molecules (molecular motors, DNA-protein interactions, membrane proteins) to cellular functions (cell adhesion, cell division, cell motility, intracellular transport) and the collective behaviour of cells in tissues and organisms (wound healing, morphogenesis). They include the use of many experimental systems going from isolated molecular assemblies and biomimetic systems to cellular and multicellular systems.

The approaches combine theoretical studies – including statistical physics of non-equilibrium systems – and a variety of experimental techniques such as optical and electron microscopy, as well as microfluidics and micropatterning, optogenetics, or mechanical micromanipulation using optical or magnetic tweezers.

Key publications

Year of publication 2018

Duclos G., Blanch-Mercader C., Yashunsky V., Salbreux G., Joanny J.-F., Prost J., Silberzan P.
(2018 Oct 3)

Spontaneous shear flow in confined cellular nematics

Nature Physics : [DOI : 10.1038/s41567-018-0099-7](https://doi.org/10.1038/s41567-018-0099-7)

Feng-Ching Tsai, Aurelie Bertin, Hugo Bousquet, John Manzi, Yosuke Senju, Meng-Chen Tsai, Laura Picas, Stephanie Miserey-Lenkei, Pekka Lappalainen, Emmanuel Lemichez, Evelyne

Coudrier, Patricia Bassereau (2018 Sep 30)

Ezrin enrichment on curved membranes requires a specific conformation or interaction with a curvature-sensitive partner.

elife : 7 : e37262 : [DOI : 10.7554/eLife.37262](https://doi.org/10.7554/eLife.37262)

Merle T, Farge E. (2018 Aug 1)

Trans-scale mechanotransductive cascade of biochemical and biomechanical patterning in embryonic development: the light side of the force.

Curr. Opin. Cell. Biol. : [DOI : 10.1016/j.ceb.2018.07.003](https://doi.org/10.1016/j.ceb.2018.07.003)

Röper Jens-Christian, Mitrossilis Démosthène, Stirnemann Guillaume, Waharte François, Brito Isabel, Fernandez-Sanchez Maria-Elena, Baaden Marc, Salamero Jean, Farge Emmanuel (2018 Jul 19)

The major β -catenin/E-cadherin junctional binding site is a primary molecular mechano-transducer of differentiation in vivo

eLIFE : 7:e33381. DOI: <https://doi.org/10.7554/eLife.33381> : [DOI : DOI:](https://doi.org/10.7554/eLife.33381)

<https://doi.org/10.7554/eLife.33381>

Broders-Bondon Florence, Nguyen Ho-Bouloires Thanh, Fernandez-Sanchez Maria Elena-Farge Emmanuel (2018 May 17)

Mechanotransduction in tumor progression: The dark side of the force.

Journal of Cell Biology : 217(5):1571-1587 : [DOI : 10.1083/jcb.201701039](https://doi.org/10.1083/jcb.201701039)

Jérémie Barral, Frank Jülicher, Pascal Martin (2018 Feb 6)

Friction from Transduction Channels' Gating Affects Spontaneous Hair-Bundle Oscillations.

Biophysical journal : 425-436 : [DOI : S0006-3495\(17\)31251-1](https://doi.org/10.1083/jcb.201701039)