



*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

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Cáceres R, Bojanala N, Kelley LC, Dreier J, Manzi J, Di Federico F, Chi Q, Risler T, Testa I, Sherwood DR, Plastino J (2018 Nov 6)

**Forces drive basement membrane invasion in *Caenorhabditis elegans***

*Proceedings of the National Academy of Sciences USA* : 115 : 11537-11542 : [DOI :](#)

[10.1073/pnas.1808760115](https://doi.org/10.1073/pnas.1808760115)

Kutscher LM, Keil W, Shaham S (2018 Oct 22)

**RAB-35 and ARF-6 GTPases Mediate Engulfment and Clearance Following Linker Cell-Type Death**

*Developmental Cell* : 47 : 222-238 : [DOI : 10.1016/j.devcel.2018.08.015](https://doi.org/10.1016/j.devcel.2018.08.015)

Vincent Nier, Grégoire Peyret, Joseph d'Alessandro, Shuji Ishihara, Benoit Ladoux, Philippe Marcq (2018 Oct 11)

**Kalman Inversion Stress Microscopy.**

*Biophysical journal* : [DOI : S0006-3495\(18\)31065-8](https://doi.org/10.1016/j.bpj.2018.08.015)

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)

Katz M, Corson F\*, Keil W\*, Singhal A, Bae A, Lu Y, Liang Y & Shaham S (2018 Sep 13)

**Glutamate spillover in *C. elegans* triggers repetitive behavior through presynaptic activation of MGL-2/mGluR5**

*bioRxiv* : [DOI : 10.1101/415828](https://doi.org/10.1101/415828)