



Unit Director
Maxime Dahan
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 2017

Thuan Beng Saw, Amin Doostmohammadi, Vincent Nier, Leyla Kocgozlu, Sumesh Thampi, Yusuke Toyama, Philippe Marcq, Chwee Teck Lim, Julia M Yeomans, Benoit Ladoux (2017 Apr 14)

Topological defects in epithelia govern cell death and extrusion.

Nature : 212-216 : [DOI : 10.1038/nature21718](https://doi.org/10.1038/nature21718)

Démosthène Mitrossilis, Jens-Christian Röper, Damien Le Roy, Benjamin Driquez, Aude Michel, Christine Ménager, Gorky Shaw, Simon Le Denmat, Laurent Ranno, Frédéric Dumas-Bouchiat, Nora M Dempsey, Emmanuel Farge (2017 Jan 24)

Mechanotransductive cascade of Myo-II-dependent mesoderm and endoderm invaginations in embryo gastrulation.

Nature communications : 13883 : [DOI : 10.1038/ncomms13883](https://doi.org/10.1038/ncomms13883)

Year of publication 2016

Mijo Simunovic, Emma Evergren, Ivan Golushko, Coline Prévost, Henri-François Renard, Ludger Johannes, Harvey T McMahon, Vladimir Lorman, Gregory A Voth, Patricia Bassereau (2016 Oct 4)

How curvature-generating proteins build scaffolds on membrane nanotubes.

Proceedings of the National Academy of Sciences of the United States of America : 113 : [DOI : 10.1073/pnas.1606943113](https://doi.org/10.1073/pnas.1606943113)

Year of publication 2017

Duclos G., Erenkämper C., Joanny J.-F., Silberzan P. (2016 Sep 12)

Topological defects in confined populations of spindle-shaped cells

Nature Physics : 13 : 58-62 : [DOI : 10.1038/nphys3876](https://doi.org/10.1038/nphys3876)

Year of publication 2016

A Bertin, E Nogales (2016 Jul 31)

Preparing recombinant yeast septins and their analysis by electron microscopy.

Methods in cell biology : 21-34 : [DOI : 10.1016/bs.mcb.2016.03.010](https://doi.org/10.1016/bs.mcb.2016.03.010)

Vincent Nier, Shreyansh Jain, Chwee Teck Lim, Shuji Ishihara, Benoit Ladoux, Philippe Marcq (2016 Apr 14)

Inference of Internal Stress in a Cell Monolayer.

Biophysical journal : 1625-35 : [DOI : 10.1016/j.bpj.2016.03.002](https://doi.org/10.1016/j.bpj.2016.03.002)



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