



Unit Director
Maxime Dahan
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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

Sherwood DR, Plastino J (2018 Jan 1)

Invading, leading and navigating cells in *Caenorhabditis elegans*: insights into cell movement in vivo

Genetics : 208 : 53-78 : [DOI : 10.1534/genetics.117.300082](https://doi.org/10.1534/genetics.117.300082)

Year of publication 2017

Francesco Gianoli, Thomas Risler, Andrei S. Kozlov (2017 Dec 19)

Lipid bilayer mediates ion-channel cooperativity in a model of hair-cell mechanotransduction

Proceedings of the National Academy of Sciences of the United States of America : 114 : E11010-E11019 : [DOI : 10.1073/pnas.1713135114](https://doi.org/10.1073/pnas.1713135114)

Mijo Simunovic, Jean-Baptiste Manneville, Henri-François Renard, Emma Evergren, Krishnan Raghunathan, Dhiraj Bhatia, Anne K. Kenworthy, Gregory A. Voth, Jacques Prost, Harvey T. McMahon, Ludger Johannes, Patricia Bassereau, Andrew Callan-Jones (2017 Jun 22)

Friction mediates scission of tubular membranes scaffolded by BAR proteins

CellCell : 170 : 172-184 : [DOI : 10.1016/j.cell.2017.05.047](https://doi.org/10.1016/j.cell.2017.05.047)

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)

P Guichard, V Hamel, M Le Guennec, N Banterle, I Iacovache, V Nemčiková, I Flückiger, K N Goldie, H Stahlberg, D Lévy, B Zuber, P Gönczy (2017 Mar 24)

Cell-free reconstitution reveals centriole cartwheel assembly mechanisms.

Nature communications : 14813 : [DOI : 10.1038/ncomms14813](https://doi.org/10.1038/ncomms14813)

Vincent Hakim, Pascal Silberzan (2017 Mar 11)

Collective cell migration : a physics perspective.

Reports on progress in physics. Physical Society (Great Britain) : 80 : 076601 : [DOI : 10.1088/1361-6633/aa65ef](https://doi.org/10.1088/1361-6633/aa65ef)