Master Nanochemistry

Internship subject

Interrogating the metabolism of cell locomotion with optogenetics

Confidential subject: No

Subject open to M2: Yes **to M1:** Yes

Subject adapted to LabTraining: no

Summary

The mechanobiology field has spread out remarkably over the last years, closely connected to the development of methods to probe and quantify the forces exerted by cells and tissues at different scales. It's now widely recognized that cells use their ability to exert forces to take decision like choosing their direction of motion. The purpose of this internship is to combine recent advances in the design of cell microenvironment with optical force microscopy in order to measure how cell use biochemical energy to transform it into active forces during motion. Practically the intern will work in a very interdisciplinary environment and will be trained on different techniques ranging from bio-imaging, micropatterning to optogenetics.

Related Publications

Lost in mechanobiology, what's next?: Missing tools related to the physics of the system. *Kurzawa L, Balland M. Biol Cell. 2019 Aug;111(8):213-215.*

Acto-myosin force organization modulates centriole separation and PLK4 recruitment to ensure centriole fidelity. *Vitiello E, Moreau P, Nunes V, Mettouchi A, Maiato H, Ferreira JG, Wang I, Balland M. Nature Commun. 2019 Jan 3;10(1):52.*

Confinement-Induced Transition between Wavelike Collective Cell Migration Modes. *Petrolli V, Le Goff M, Tadrous M, Martens K, Allier C, Mandula O, Hervé L, Henkes S, Sknepnek R, Boudou T, Cappello G, Balland M. Physical Rev Lett. 2019 Apr 26;122(16):168101.*

Background and skills expected

A training at the interface in between physics and biology will be a great thing, but we are mostly interested by highly motivated students that are curious and creative

Competences that will be acquired during the internship

-Microfabrication for cell biology, Optogenetics, Optical microscopy, Image analysis

Supervisor(s) : Martial Balland

Laboratory : LIPHY (Laboratory for Interdisciplinary Physics)

Team/Group : MicroTiss

Contacts - E-mail : martial.balland@univ-grenoble-alpes.fr **Web-page :** https://www.youtube.com/channel/UCTWnSWGnMHqhb4Xm56OwkLg

This Master internship could be followed into a PhD within the same research area: Yes