Platform µLife

Fluorescence microscopy imaging

Visualising the molecular architecture of living entities

µLife is a microscopy platform dedicated to fluorescence imaging. Equipped with state-of-the-art instruments, µLife can handle a wide range of applications, from high-resolution molecular imaging to dynamic imaging for life-sciences.

The R&D work performed on the platform relies on a technology watch approach, through which, in particular, the platform is able to acquire and test innovative equipment before it becomes commercially available.

Expertises

- **Visualise**
  dynamic events rapidly in several dimensions
- **Characterise**
  fixed or dynamic molecular structures using evanescent wave imaging
- **Co-localise**
  molecules using high-resolution molecular imaging
- **Quantify**
  the dynamic protein renewal by targeted illumination : FRAP, photoconversion
- **Study**
  the mechanical properties of a structure by laser photoablation
- **Measure**
  cellular traction stresses using «Traction Force Microscopy»
- **Modify**
  the cellular environment in a controlled manner thanks to laser-induced dynamic patterning

Focus

Super resolution Microscopy

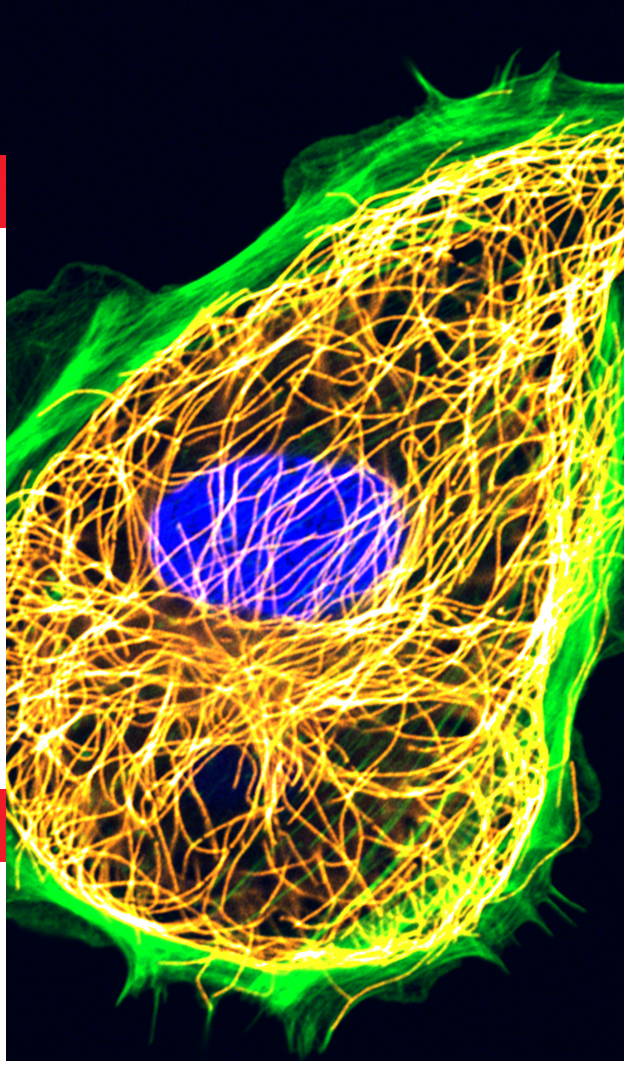
The µLife platform is distinguished at national level by its β-tester activity for innovative technology, including for example focusing on high- and super-resolution techniques.

These techniques make it possible to exceed the light diffraction limit and achieve resolutions in the range of a few tens or hundreds of nanometers.

> Recently-acquired equipment increases the resolution while maintaining the possibility to observe dynamic processes in live.

Technology and tools

- **1 confocal microscope**
  1 Zeiss LSM880 equipped with a Fast AiryScan detector
- **1 Nikon spinning disk confocal microscope**
  equipped with a laser photo-ablation module and a Live-SR module (Gataca)
- **1 Nikon multimodal tirf**
  equipped with a targeted illumination module ; equipped with a laser photo-ablation module ; compatible with super-resolution (PALM)
- **1 Olympus inverted fluorescence microscope**
  to observe live samples in phase-contrast or epifluorescence
- **1 cell culture laboratory**
  with a BSL2 containment level
- **1 data-analysis station**



Services

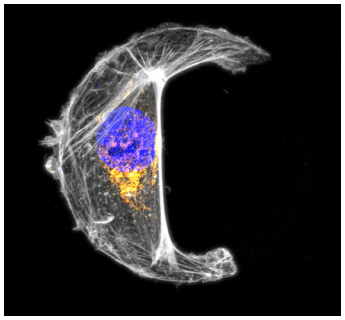
- **Advice and follow-up on projects** from sample preparation to image acquisition
- **Expertise** in imaging single filaments *in vitro* and *in cellulo* molecular imaging, traction stresses measurement by «traction force microscopy» and dynamic «laser patterning»
- **Practical and theoretical training** on the equipment
- **Technical assistance** for use of equipment
- **Temporary data storage** and transfer to a server exclusively dedicated to platform users
- **Technology watch** associated with R&D activity making it possible to offer the latest state-of-the-art technology

Highlights

Nature Materials 2023
Compressive forces stabilize microtubules in living cells

EMBO Journal 2022
Actin network architecture can ensure robust centering or sensitive decentering of the centrosome.

PNAS 2022
Actin-microtubule dynamic composite forms responsive active matter with memory



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TO DEVELOP YOUR PROJECT
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