LIFA, a versatile camera-based Frequency domain FLIM system

J.S.A. Herz[1]

[1] Lambert Instruments BV, Groningen, The Netherlands.

Abstract

Fluorescence Lifetime Imaging Microscopy (FLIM) is gaining interest as a tool to assess the biochemical environment of fluorescent molecules/probes. Upon excitation, fluorescent molecules emit light and the fluorescence lifetime quantifies the decay rate of that emitted light. The fluorescence lifetime is a telltale signature of the molecules and their immediate environment. Among others, the decay time can be affected by pH, pressure, temperature and neighboring fluorescent molecules (FRET)

FLIM is the technique to map the spatial distribution of lifetimes in living cells and inorganic material. A key advantage of the fluorescence lifetime over the light intensity is that fluorescence lifetime is independent of concentration, bleaching and intensity variations, making it an inherently quantitative technique.

The LIFA is a camera-based FLIM system for fast Fluorescence lifetime imaging. Trough the frequency-domain detection technology offered by the modulated camera and light source, it allows fast acquisition of lifetime images.

The camera makes the LIFA highly versatile and therefore applicable for live cell imaging. The standard, widefield system includes a Multi-LED modulated light source with high-power LEDs. Using a Multi-LASER engine it can be easily combined with Total Internal Reflection Fluorescence (TIRF), with multi-beam confocal spinning disk, or with lightsheet Microscopy.

Workshop schedule:

- 10-15 min.: brief introduction to camera-based frequency domain FLIM

- 30 min. Handson on FLIM measurements from a selection of samples (plan is to demonstrate FRET, participants are encouraged to bring own samples)

- 15 min summary and Q&A