



**Monday, February 17**

**11:30 AM – 1:00 PM**

**Room 33A**

**Leica Microsystems**

**Leica SP8 FALCON: Applications of FLIM for Functional Imaging and STED Nanoscopy**

The rapidly growing field of functional imaging helps us understand the complex interactions of molecules, revealing the true nature of the underlying biology. In this context, fluorescence lifetime imaging (FLIM) is a powerful tool, providing valuable information beyond spectral imaging. FLIM is immune to concentration artifacts and highly sensitive to the molecular environment, providing a robust measure of a biological system's health. However, previous FLIM solutions were slow and difficult to implement, particularly for complex imaging workflows. To address this weakness, we present the Leica SP8 FALCON (Fast Lifetime Contrast), a fast, intuitive and totally integrated, all-Leica FLIM solution. The SP8 FALCON delivers video-rate FLIM with pixel-by-pixel quantification, due to a unique combination of fast electronics, sensitive spectral hybrid detectors (Leica HyDs), and a novel concept for measuring time. The system has ultra-short dead time and powerful built-in algorithms to manage data acquisition and analysis, while maintaining accuracy and excellent data quality.

This talk explains the technical implementations enabling this new level of performance and provides some interesting application examples, including functional imaging (e.g. metabolic imaging or FRET imaging) and the use of lifetime information to achieve improved live-cell Nanoscopic Imaging ( $\tau$ -STED).  $\tau$ -STED is a revolutionary modality for STED imaging, making use of the FALCON FLIM phasor approach, delivering cutting-edge resolution and image quality at low light dose, especially beneficial for live-cell nanoscopy applications.  $\tau$ -STED takes the fluorescence lifetime information from all detected photons combined with phasor analysis in a novel way to increase the resolution and eliminate uncorrelated background in an automated manner. The  $\tau$ -STED implementation on Leica SP8 STED 3x systems works for 2D and 3D STED in live and in fixed specimens, and for multicolor applications.

The deep integration of SP8 FALCON into the Leica SP8 platform provides easy access to complex FLIM experiments, enabling fast FLIM-FRET, 3D- and 4D-imaging modes, high-content screening, and auto-fluorescence component separation.

**Speaker**

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