

FAST AND FLEXIBLE WHITE LIGHT OPTICAL SECTIONING FOR LIVE CELL IMAGING

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During the last few decades a large number of techniques have been developed that allow contributions from out of focus regions of biological specimens to be removed optically when imaged with a microscope, thus leaving a clear image of the focal plane. This family of techniques is most commonly referred to as optical sectioning microscopy. Carl Zeiss has always pioneered advances in the field and continues to do so with its increasing portfolio of optical sectioning systems:

Structured illumination microscopy using grid projection provides an easy-to-use means for optical sectioning in fluorescence microscopy. It is easy to implement as the necessary hardware only compromises a slider for the field stop position of a conventional fluorescence microscope. It can be used with white light illumination, thus, there are no restrictions on the dyes used. However, as for one optical section three raw data images have to be acquired, the use of such a structured illumination system for live cell imaging is limited to slow processes taking place in the range of several seconds. T. Wilson and colleagues suggested an alternative, light efficient technique for optical sectioning using a spinning disk approach to structured illumination [1]. Recently they developed this into a commercial product, which is now available as part of the Carl Zeiss system and software environment. With this new instrument structured illumination enters the field of fast live cell imaging.

This talk will cover the principle of operation of this new instrument, its implementation in the Carl Zeiss system environment and describe its usability in various applications.

[1] R. Juskaitis, T. Wilson, M. Neil and M. Kozubek, "Efficient real-time confocal microscopy with white light sources", *Nature*, **383**, 804-806 (1996)