

AUTOSCREEN - A novel platform concept for automated high throughput and high end microscopy

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High-performance microscope systems are typically bulky, expensive research instruments requiring highly skilled personnel. The more sophisticated imaging modes they provide (i.e. the higher the content), the lower gets their throughput. On the other hand, screening platforms optimized for automated high-throughput, are usually reduced to the most fundamental imaging modes and thus exhibit rather limited performance capabilities. Within the AUTOSCREEN project we have tried to overcome this mutual exclusivity by pursuing several pathways leading to a highly compact, fast and automated microscope reader, which integrates high-end imaging modes previously found in high-end research instruments only. The resulting 3D microscopy screening platform is meant to set a new gold standard towards compact, low-cost high-throughput instruments and constitute a major break-through for the life sciences, both in an academic and an industrial environment.

The AUTOSCREEN platform comprises:

- Continuous, uninterrupted scanning of large areas in transmitted light, both in direct and oblique illumination.
- 3D-sectioning by means of novel concepts for structured illumination microscopy.
- Multispectral fluorescence excitation using 8 different LED-sources ranging from 360 - 640 nm.
- Dual emission imaging permitting emission images to be split into two spectral ranges.
- A novel concept for robust autofocus- and focusclamp-functionality.
- A graphical user-interface for microscope control.
- Protocol-driven real-time performance.
- Integration into a lab automation system.