

From Motorisation to Automation in Imaging: Technological development opens a new chapter for Automated Microscopy

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Biological light microscopy is an essential tool for modern molecular, cell and developmental biology. It spans applications in basic research, preclinical and even clinical environments. Rapid developments at all levels of microscopy such as contrast, illumination, resolution, signal detection and data processing have taken place, however, severe limitations in accuracy, reproducibility and throughput are caused by the involvement of humans in all steps of the imaging workflow. In addition, with the large variety of equipment and techniques that are combined in the modern research environment, it is no longer reasonable to expect all users to be experts in microscopy and as such the drive towards 'hands-off' high end imaging is considerable.

Commercial boxed microscope systems have become increasingly popular over the last 10 years. While generally easier to use than conventional microscopes these boxed solutions lack the image quality and flexibility of a classical stand and as such, more sophisticated experiments are challenging or often impossible to run using these types of machine.

ZEISS Celldiscoverer 7 for the first time combines the optical quality of a research class microscope stand with the automation features of a boxed microscope, while maintaining a huge amount of flexibility. Now even inexperienced users are able to produce results of the best achievable quality in a reproducible manner. The completely new and unique optical concept of the instrument enables unprecedented sensitivity for applications as varied as imaging live specimens over days and weeks at a time and screening fixed samples in a fast and efficient manner with the robotic loader.

The machine automatically detects the sample carrier parameters, e.g. bottom thickness and material, and adopts its optics accordingly. Routine experiments can be executed with the click of a single button and as a result long user trainings and system down-time due to improper use or maintenance are a thing of the past.

This marriage of optical quality and ease-of-use offers unique possibilities in the research environment. It is this exclusive combination that promises to lead the movement of automated microscopy to becoming the standard acquisition technique of scientific microscopy data in the future.