

Expanding the Imaging Horizon: Innovations in Automation, High-Multiplexing Workflows, and Spatial Phenotyping

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As imaging technologies evolve, researchers are empowered to explore biological complexity with increasing depth, scale, and precision. In this workshop, Leica Microsystems presents three innovations that address distinct challenges in modern microscopy.

We begin with Advanced Autonomous Microscopy for STELLARIS, a flexible, API-driven solution that will enable intelligent sample navigation, dynamic automated acquisition, and external image analysis. This approach will support target detection and complex imaging tasks with minimal manual intervention, enhancing reproducibility and throughput.

Next, we introduce SpectraPlex for STELLARIS, a dedicated toolbox for 3D high-multiplex imaging designed to support spatial discoveries across scales. With full flexibility in fluorophore selection and compatibility with over 15 markers per sample, SpectraPlex enables researchers to visualize molecular interactions in their true 3D context, an incomparable advantage for cancer and immunology research. The guided workflow includes automated experiment setup, input of reference and controls, and unmixing review, streamlining the process from panel design to data acquisition. Downstream analysis is performed using Aivia to extract meaningful spatial insights.

Finally, we present Cell DIVE, an open, iterative multiplexing solution for large 2D tissue sections. Capable of visualizing over 60 biomarkers on a single section without tissue damage, Cell DIVE combines precise staining cycles with AI-based analysis in Aivia to uncover cellular phenotypes and spatial relationships at scale.

Each of these technologies offers a unique path to deeper biological understanding. Join us to explore how they can support your research goals.