

Automated LSM

EUROPEAN LABORATORY FOR
NON-LINEAR SPECTROSCOPY



A NEW MICROSCOPY
PARADIGM FOR QUANTITATIVE
ANALYSIS OF 3D SAMPLES

TECHNOLOGY DESCRIPTION

We have devised a complete pipeline of light-sheet microscopy, encompassing sample clearing and staining, fully automated high-resolution high-speed imaging, and teravoxel image processing. The microscopy pipeline makes it possible to analyse macroscopic tissue samples at sub-cellular resolution. Our system has two fundamental advantages: first, imaging quality is always kept high thanks to automated feedback systems for light-sheet stabilization and autofocusing. Second, a dedicated set of software tools enables management and effective access to teravoxel-sized images, allowing subsequent data analysis. Competitors do not provide any active stabilization of the light sheet, requiring continuous adjustment of imaging parameters by the user. On the other hand, they also do not provide links between imaging system and image analysis tools.



TIGHT INTERCONNECTION BETWEEN IMAGING SYSTEM AND IMAGE ANALYSIS TOOLS ENABLES EFFECTIVE MANAGEMENT OF TERAVOXEL-SIZED IMAGING DATASETS



FULLY AUTOMATED MICROSCOPY ENABLES SCALABLE 3D ANALYSIS OF BIOLOGICAL TISSUES FOR RESEARCH AND CLINICAL PURPOSES

AREAS

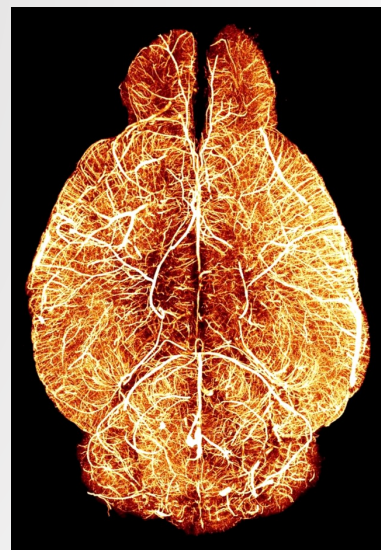
Neuronal imaging | High-throughput microscopy 3D histology | Digital pathology



COMPETITIVE ADVANTAGES

- High-resolution, fast, fully automated 3D imaging of tissue samples. Few hours needed to process 1 cm³ with 1 μm³ resolution
- Patented feedback solutions for real-time stabilization of the light sheet and autofocusing
- User is not left alone with a huge quantity of raw data, as with current commercial solutions
- Allows scalable volumetric analysis of multiple tissue samples.

**NEW LIGHT-SHEET MICROSCOPY
ENABLES SCALABLE ANALYSIS
OF LARGE SAMPLES AT
SUBCELLULAR RESOLUTION**



vasculature network in the whole mouse brain



APPLICATION & MARKET POTENTIAL

Preclinical research: quantitative and reliable quantification of drug effects at whole-organ scale

Personalised medicine: Improved assessment of drug efficacy on patient-derived organoids



Histopathological analysis of human tissue for augmented diagnostic & prognostic power

Worldwide optical microscopy market in 2018 is about 2 billions \$ and histopathology market about 3.5-4 billions \$ (source: marketsandmarkets.com)



REFERENCES

- High-throughput automated light-sheet microscope used within Human Brain Project and the NIH BRAIN Initiative
- Top-tier published papers (Silvestri et al., Nature Methods 2021)
- Collaboration with University of Florence and National Research Council for technology R&D
- Patent WO2018122093A1



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TECHNOLOGY READINESS LEVEL

