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MICROSCOPY

Tech Pulse

PHOTONICS MEDIA

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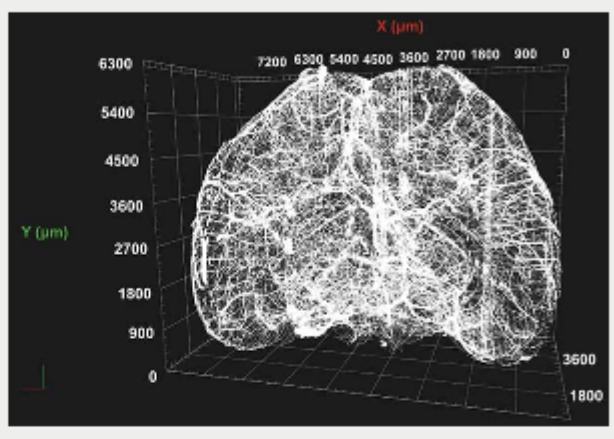
Microscopy Tech Pulse is a special edition newsletter from Photonics Media and Mad City Labs Inc. covering key developments in microscopy technology. Manage your Photonics Media membership at Photonics.com/subscribe.

Histology Breaks a Speed Barrier

Today's optical instruments are outpacing human bandwidth and forcing their human designers and end users to operate more like orchestrators of complex, interlocked components. An integrated, automated microtome and microscopy platform sections and images tissue samples thousands of times faster than a human.



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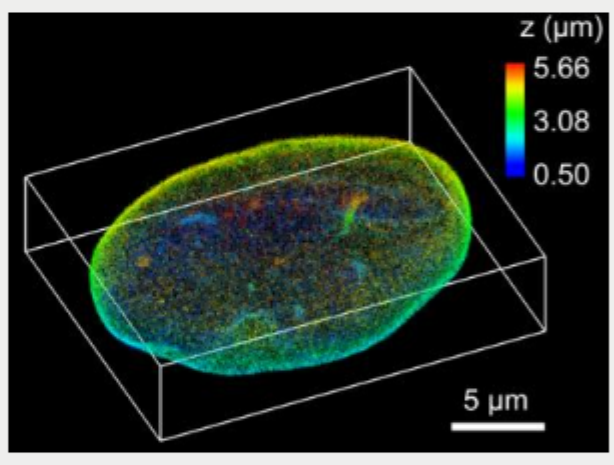
Microscope Provides Precise 3D Imaging of Thick Mammalian Cells

TILT3D — tilted light-sheet microscopy with 3D point spread functions (PSFs) — combines a tilted light-sheet illumination technique with long axial range PSFs for low-background, 3D super-localization of single molecules and for 3D superresolution imaging in thick cells. The microscope produces 3D nanoscale images of mammalian cells in their entirety.



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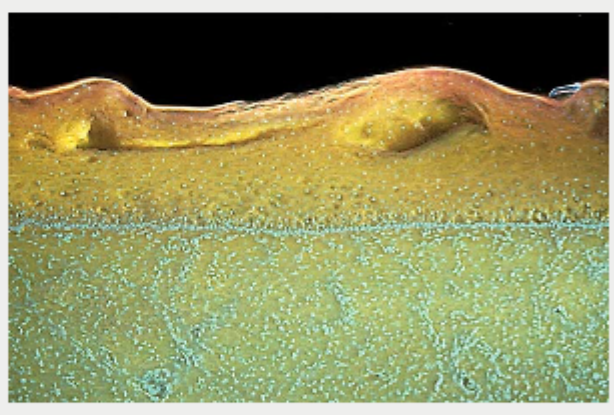
MUSE: Simple Slide-Free Microscopy

A new technique skips traditional histology steps to speed up diagnosis and allow for views that are not possible with conventional sectioning. Even in this era of molecular medicine, conventional light microscopy remains the principal contributor to cancer diagnostics and also serves to guide surgical procedures, monitor disease activity and follow therapy responses over time.



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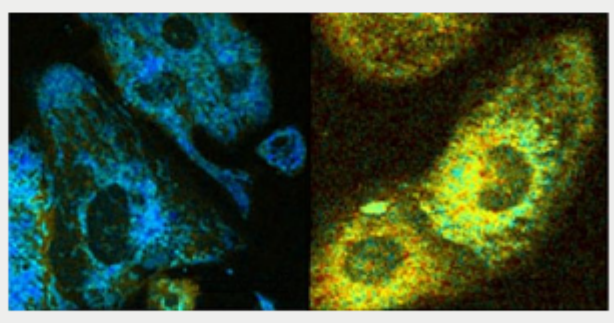
Optical Tool Uses Fluorescence to Detect Metabolic Changes

An optical tool that can read metabolism at subcellular resolution could be used to identify specific metabolic signatures indicative of disease. The method detects functional and structural metabolic biomarkers noninvasively using endogenous two-photon excited fluorescence (TPEF) from two coenzymes that are involved in a large number of metabolic pathways in every cell.



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UCF Team Using Microscopy to Diagnose Parkinson's Disease

Researchers at the University of Central Florida are using single-molecule pull-down (SiMPull) assays to understand and diagnose Parkinson's disease. The team used single-molecule total internal reflection fluorescence (TIRF) microscopy to visualize single proteins captured by fluorescently labeled antibody and in vivo crosslinker to preserve native states of biological samples including cultured cells and postmortem brain tissues.

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FLIM Delineates Tumor Margins in Real Time

During surgical procedures, it is imperative to rapidly distinguish between cancer and surrounding healthy tissue and to determine where and how much tissue to cut. Several clinical applications have demonstrated that optical molecular imaging can serve as a powerful intraoperative tool for guiding surgeons performing surgical interventions, including robotic procedures.

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