

Super-resolution microscope for 3D cell and tissue imaging

Requirements in super-resolution imaging

The development of super-resolution imaging has significantly revolutionized cell biology. Current modern fluorescence microscopy excels at live cell imaging, which requires fast speed, less photo toxicity, and a broad field of view. There is however a tradeoff between extreme spatial resolution in field of view, time resolution and computational load.

3D-MSM for super-resolution imaging of cells

Innovators at Georgia Tech have developed a three-dimensional multifocal scanning microscopy, or 3D-MSM, for super-resolution imaging of cells and tissues with substantially reduced instrumental complexity. 3D-MSM harnesses the inherent 3D movement of specimens to facilitate stationary, multi-focal excitation, thus achieving super-resolution microscopy via a standard epi-fluorescence platform. 3D-MSM can not only be used for live cell imaging but has also been shown effective over a variety of biological samples and can be used with multiple fluorescent probes.

Summary Bullets

- The technology facilitates super-resolution cell and tissue imaging with multiple colors.
- The technology provides easy access to commonly adopted protocols, which has an expected wide usage.
- 3D multifocal scanning microscopy facilitates stationary, multi-focal excitation, thus achieving super-resolution microscopy.

Solution Advantages

- **Super-Resolution:** combines structured illumination microscopy with confocal microscopy for superior cell and tissue imaging with multiple fluorescent colors.
- **Easy Access:** Easily implemented with existing microscopes allowing for quick and wide application.
- **Multi-Dimensional:** 3D multifocal scanning microscopy facilitates stationary and multi-focal excitation, thus achieving super-resolution microscopy.

Potential Commercial Applications

- Usage in research microscopy settings
- Usage in clinical microscopy settings

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IP Status

<p>Patent application has been filed</p>: US63/513674

Publications

[Simultaneous Multicolor Multifocal Scanning Microscopy](#), ACS Photonics - July 24, 2023

Images

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<https://s3.sandbox.research.gatech.edu//print/pdf/node/4128>