

Simultaneous Acquisition Of Multiple Epi-Fluorescence Micrographs

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INVENTION NOVELTY

UCSF researchers have developed a novel microscope system which allows multiple images of a single sample to be acquired simultaneously. These images are structured and, when coupled with conventional structured illumination image processing methods, can provide video rate, super-resolution micrographs.

TECHNOLOGY DESCRIPTION

High temporal and spatial imaging helps in a wide range of biological sciences, from plant sciences to mammalian models. While strategies such as structured illumination and rejection of out of focus light allow spatial resolution beyond the Nyquist limit, temporal rates are low as numerous images have to be sequentially acquired for reconstruction of the final image. Furthermore, because many sequentially acquired images are required for structured illumination, its application in living samples (moving or otherwise time varying) has been impossible. UCSF inventors demonstrate a new microscopy system for which allows simultaneous acquisition of all images required for structured illumination. This approach enables video rate (limited only by light throughput) acquisition of super-resolution micrographs. Because this is fundamentally a wide field approach, no stimulation light scanning is required and there are no moving parts. This methodology greatly simplifies the creation of structured images, and reduces misalignment issues which can plague standard implementations of structured illumination. This new system can collect images at higher rates, lower cost, and at comparable or higher resolution than other techniques (conventional spinning disk confocal microscopy or structured illumination systems).

VALUE PROPOSITION

A microscope imaging system for imaging samples in high temporal and spatial resolution that is cheaper and faster than confocal microscopy. This method overcomes drawbacks of existing imaging systems because it is:

- ▶ Inexpensive to product and maintain relative to comparable systems
- ▶ Compatible with any existing system that uses structured light
- ▶ Capable of super-resolution videos of live, time varying, samples

APPLICATION

The system will be broadly applicable in research settings:

- ▶ User facilities and research labs may use this system as an alternative to confocal or conventional structured illumination on both live and fixed samples
- ▶ Can be inserted into existing microscope systems to enable new imaging capabilities
- ▶ Enable new, high spatial resolution studies of moving or time varying samples

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INVENTORS

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OTHER INFORMATION

KEYWORDS

structured illumination,
microscope, super-resolution
micrographs

CATEGORIZED AS

- ▶ [Imaging](#)
- ▶ [Other](#)

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2019-139-0

LOOKING FOR PARTNERS

To further develop and commercialize this technology.

STAGE OF DEVELOPMENT

The invention has been reduced to practice.

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