

Large Field-Of-View Two-Photon Miniscope with Compact Footprint

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ABSTRACT

Researchers at the University of California, Davis have developed a compact two-photon miniscope designed to support high-resolution neural activity imaging over an expanded field of view in freely moving animals. The system achieves a favorable balance between imaging performance and device footprint, enabling large-scale neural observations while minimizing interference with natural behavior.

FULL DESCRIPTION

This miniaturized two-photon imaging platform introduces a streamlined optical design that enables wide-area, high-resolution imaging for observing biological activity across a larger area than the area in typical miniature systems . The system supports cellular-level visualization and volumetric imaging while maintaining mechanical and optical simplicity suitable for use in freely moving subjects.

The technology is designed to support advanced neuroscience research requiring simultaneous observation of distributed neural tissues. In addition to pre-clinical research applications, the platform may be adaptable for compact biomedical imaging tools where small size, large imaging coverage, and high resolution are critical.

APPLICATIONS

- ▶ Neural activity imaging in freely moving animals.
- ▶ Large-scale neural circuit and network studies across large areas in multiple preclinical models.
- ▶ Compact optical imaging probes for biomedical research.
- ▶ Benchtop and translational research applications requiring small-form-factor imaging tools.
- ▶ Advanced research tools for brain-behavior relationship studies and pre-clinical pharmaceutical testing.

FEATURES/BENEFITS

- ▶ Enables wide-area, high-resolution two-photon imaging in a compact device.
- ▶ Provides a compact and lightweight design that is less likely to affect the natural behavior of the animal.
- ▶ Optimized objective design supports high-quality imaging.
- ▶ Supports rapid volumetric (3D) imaging.
- ▶ Adaptable for neuroscience and biomedical research.
- ▶ Extends the practical imaging coverage of miniaturized two-photon systems.

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INVENTORS

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OTHER INFORMATION

KEYWORDS

biomedical imaging, brain activity, compact design, multi-photon microscopy, neural imaging, volumetric imaging, neuroscience research tools, two-photon microscope

CATEGORIZED AS

- ▶ **Optics and Photonics**
 - ▶ All Optics and Photonics
- ▶ **Agriculture & Animal Science**
 - ▶ Animal Science

- ▶ Balances imaging performance and compactness Supports simultaneous observation of large neural populations.
- ▶ Intended for research use; potential future translation subject to validation.

PATENT STATUS

Patent Pending

- ▶ **Biotechnology**
- ▶ Health
- ▶ **Imaging**
- ▶ Medical
- ▶ Molecular
- ▶ **Medical**
- ▶ Devices
- ▶ Research Tools

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