Light Pipe Microscope

Centimeter-scale deep-brain imaging system for mapping whole-animal neural activity at high resolution.

Researchers at Purdue University have developed a method for better understanding the animal brain and neurological disorders. This method involves a redesign of the microscope for more detailed imaging along with capturing signals that are sent through the brain. The light pipe microscope can take images on a centimeter scale instead of the current millimeter scale along with multiple larger regions simultaneously instead of one region at a time. This large region imaging allows imaging of the entire brain with high resolution. This technology can be used to observe various types of cells noninvasively across the entire brain which can benefit neuroscience research and possibly be used in the medical field on humans in the future.

Technology Validation:

This technology has been validated using a prototype light pipe microscope. This prototype successfully enabled in vivo deep-tissue calcium imaging.

Advantages:

- Large-scale and high-resolution images of the brain

- Efficient deep tissue imaging

- Detail understanding of animal brain functions.

Applications:

- Simultaneously image the entire brain of animals for neuroscience research.

- Large region imaging for intraoperative fluorescence imaging.

- High-performance miniature microscope for head-mounted systems.

TRL: 3

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Category
Digital Health & Medtech/Medical Image Processing
Materials Science & Nanotechnology/Nanomaterial Characterization & Imaging Tools

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