# PIXELATION-FREE WIDEFIELD IMAGING THROUGH AN APERIODIC MULTICORE FIBER BUNDLE

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Fiber-optic microendoscopes allow for minimally invasive high-resolution imaging deep within living organisms. Image formation with conventional fiber bundles relies on transmitting intensity information from distal end of the fiber to the proximal end. This is typically limited by two factors: (i) imaging is restricted only to the fiber endface, (ii) pixelation artifacts in the image due to the limited fill-factor of the fiber bundle. Furthermore, the absence of optical sectioning introduces more artifacts in the final image.

Using the concept of fiber-based lensless endoscopy [1] that enables wavefront control at the output of a multicore fiber bundle (MCF), we demonstrate here pixelation-free and real-time widefield endoscopic imaging through an aperiodic MCF [2]. This allows 3D-resolved imaging capabilities with spatially incoherent illumination. Furthermore, exploiting the memory effect found in MCFs [3], the images are obtained directly and without any post-processing. Our approach allows for video-rate 3D widefield imaging with imaging speed not limited by the wavefront-shaping device refresh rate.

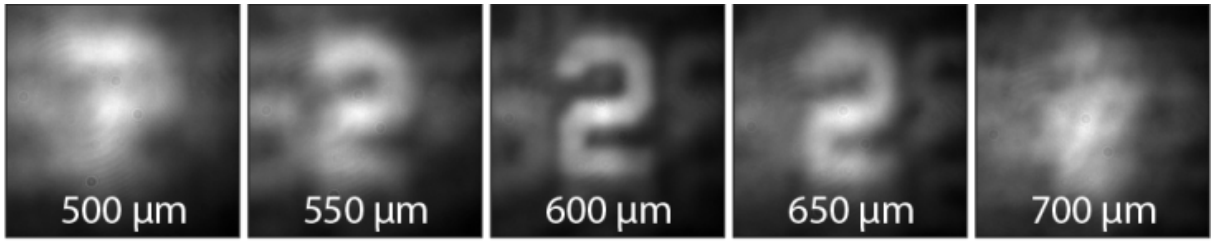


Figure 1. Demonstration of optical sectioning in the widefield configuration (effective focal distance of the imaging system is given for each image).

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