



HIGH-RESOLUTION IMAGING OF HUMAN RETINA

8x R&D is a research and product development company that brings novel technologies to the market through direct sales, joint development, technology transfer, and strategic partnerships. We can design and build custom imaging systems to address the needs of the early adopters of adaptive optics (AO) technology. Our instruments simultaneously acquire AO-assisted OCT and SLO images with cellular-level resolution in a compact footprint suitable for clinical operation. We develop research instruments based on your specifications.

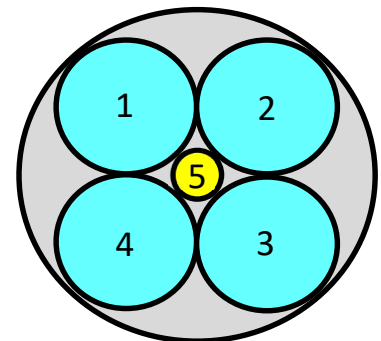


INSTRUMENT CAPABILITIES

- Simultaneous AO-OCT with AO-SLO confocal and four offset apertures (fiber bundle)
- Live four offset aperture or four split-detector imaging directions for isotropic imaging
- Visualization of retinal capillary networks using the motion of blood cells as contrast mechanism – no contrast agent needed
- Imaging of larger blood vessels to measure their diameter and their wall thickness and to visualize the fine structure of vessels walls - not possible with standard AO-SLO or any other imaging modality
- Software-controlled axial position of the focal plane within retina assisted by the OCT B-scan
- Post-processing package that provides alignment of stacks of images from the five channels, average and standard deviation images, split-detection analysis, phase and phase-gradient images, and videos showing the blood flow dynamics.

OPTICAL DESIGN PARAMETERS

- Standard image dimensions: 640 x 640 pixels
- Max pupil diameter: 6.7 mm
- Estimated resolution: $\sim 2.5 \mu\text{m}$
- Nominal field size: $1\div 5^\circ$ (user selectable)
- Field of view: $20^\circ \times 30^\circ$ (fixation)
- Frame rates up to 40 Hz

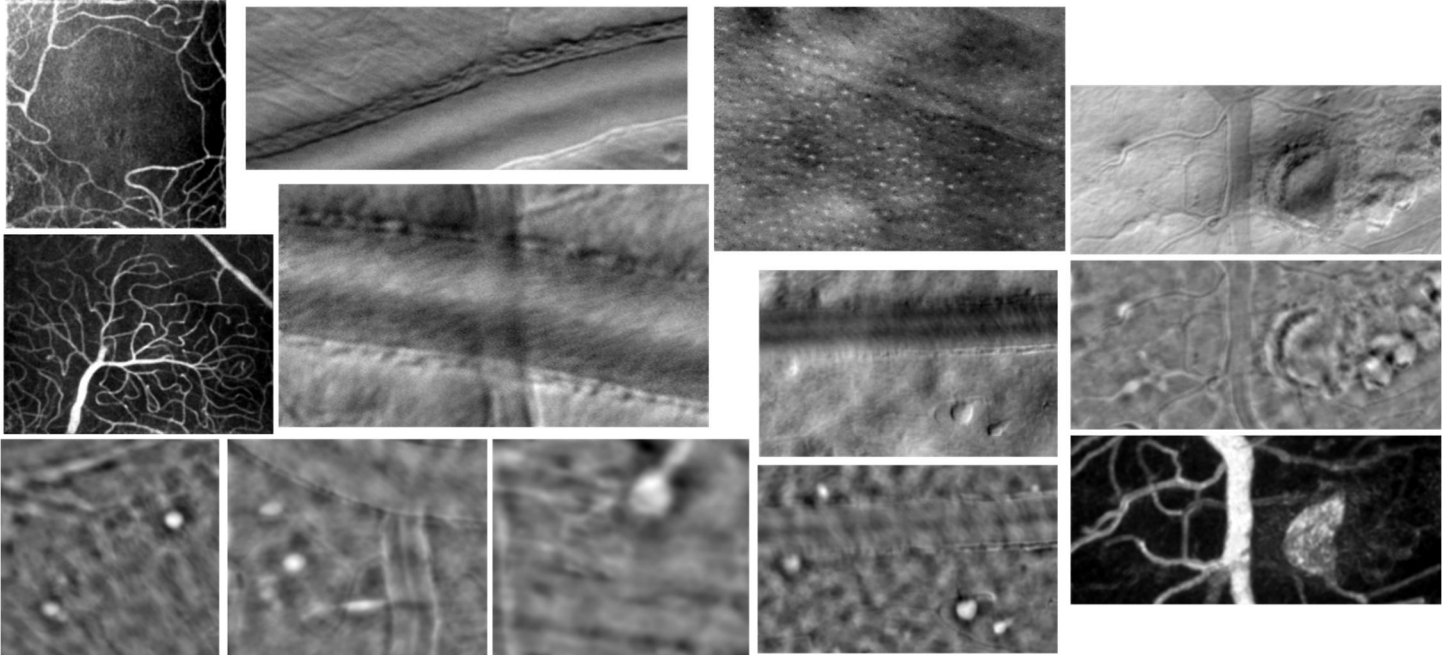


Fiber bundle detection arrangement.

COMPONENTS/FEATURES

- ALPAO DM-69
- Integrated USB point-spread function (PSF) camera for AO calibration/image quality estimation
- Complete GUI software package for AO control, image acquisition, and user interface

EXAMPLE IMAGES



Capillary networks through motion contrast, vessel wall structure (mural cells, endothelial cells, pericytes) and other microstructures like microglia, aneurysms, lipid deposits, scar tissue, exudates, thrombus, clotted aneurysms, and ganglion cells.

CUSTOM OPTIONS

- Controlled light stimulation for optoretinography (ORG)
- Controlled large area flicker for neurovascular coupling
- High-speed OCT (MHz)
- Retinal tracking
- Large area fundus image for navigation
- Fluorescence

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