

Pupil tracking for motion corrected ophthalmic optical coherence tomography

Value proposition

Optical Coherence Tomography (OCT) is the standard of care used in diagnosis as well as following the treatment of several pathological ophthalmic conditions. Volumetric acquisition with anterior segment optical coherence tomography (ASOCT) is necessary to obtain accurate representations of the tissue structure and to account for asymmetries of the anterior eye anatomy. Unfortunately, the technology does not capture volumetric images instantaneously, and are therefore subject to patient motion artifacts that may hinder their accuracy and repeatability. Several demonstrations have been made in real-time tracking for motion-compensated *in vivo* OCT retinal imaging, but these techniques are not applicable in the anterior segment.

Technology

Inventors at Duke have demonstrated a simple and low-cost pupil tracking system integrated into a custom swept-source OCT system for real-time motion-compensated anterior segment volumetric imaging. Pupil oculoigraphy hardware coaxial with the swept-source OCT system enabled fast detection and tracking of the pupil centroid. The pupil tracking ASOCT system with a field of view of 15 x 15 mm achieved diffraction-limited imaging over a lateral tracking range of +/- 2.5 mm and was able to correct eye motion at up to 22 Hz. Pupil tracking ASOCT offers a novel real-time motion compensation approach that may facilitate accurate and reproducible anterior segment imaging.

Publications

- [Carrasco-Zevallos, O. M., Nankivil, D., Viehland, C., Keller, B. & Izatt, J. A. Pupil Tracking for Real-Time Motion Corrected Anterior Segment Optical Coherence Tomography. PLOS ONE 11, e0162015 \(2016\).](#)
- [US Patent Application 15/113,800](#)

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Links

- [Dr. Joseph Izatt's Research Website](#)

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