# Compact telescope design for light scanning systems

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## Meet the Inventors

Izatt, Joseph
DuBose, Theodore "Theodore"
LaRocca, Francesco
Nankivil, Derek

## Contact For More Info

Koi, Bethany
919-681-7552
bethany.koi@duke.edu

## Department

Biomedical Engineering (BME)

## Publication(s)

## External Link(s)

- Dr. Joseph Izatt's Research Website

## Value Proposition

Scanning laser ophthalmoscopy (SLO) and optical coherence tomography (OCT) are retinal imaging modalities commonly utilized in the clinic to diagnose retinal diseases. SLO is a confocal imaging technique similar to confocal microscopy that can acquire high contrast 2D en-face retinal images in real time. OCT is an interferometric imaging technique that allows for high resolution depth sectioning and has the capability of producing high-resolution 2D cross sectional images (B-scans) of the retina at and exceeding video rate. The combination of SLO and OCT has been shown to provide more comprehensive retinal imaging, which have previously implemented into a handheld system. However, this system was relatively heavy as a handheld dev ice. The main features that constrained the minimum size and weight of this system were: 1) bulky galvanometer and resonant scanners, 2) the separation of OCT and SLO scanners, and 3) the separation of OCT and SLO illumination and collection paths.

## Technology

A new Duke technology, an ultra-compact SLO and spectral domain OCT handheld probe, weighing only 94 g which makes it possible for handheld purposes. This was possible due to the use of a single microelectromechanical systems (MEMS) scanner for both SLO and OCT, a custom compact optical design that utilizes a converging beam prior to the scanner, and a single fiber input for both SLO and OCT illumination and collection.

## Advantages

A portable, handheld SLO-OCT probe would be useful in acquiring motion-corrected OCT volumes in young children, as well as patients that are supine, under anesthesia, or otherwise unable to maintain the required posture and fixation.