Three-dimensional Ultrasound Imaging for Ophthalmology

Easy-to-use ultrasound for the identification of glaucoma and other ocular diseases that provides complete eye visualization and can be used to inform treatment and avoid unnecessary surgeries.

Background & Overview

Glaucoma, a disease which affects over 2.7 million people in the US, is one of the leading causes of irreversible blindness. One of the most complex conditions is childhood glaucoma. An affected child generally needs over 3 surgeries per eye and even more diagnostic exams under anesthesia. Currently, there are no visualization techniques in which doctors can visualize the Schlemm's canal and identify if a patient has glaucoma. In general, only ultrasound can see behind the cornea, but current ultrasounds are underutilized due to a lack of clinical expertise and need for a dedicated ultrasonographer. It is estimated that about 200,000 new cases of glaucoma occur each year, so there is a need for better visualization of the back of the eye behind the cornea so patients can be quickly diagnosed and treated.

Our solution is a 3D-UBM scanner, which consists of a high resolution 2D UBM system, but also includes a mechanical scanner giving the third dimension, an innovative custom positioning system attached to a surgical microscope, an acoustic coupling system, custom acquisition software, and innovative software for 3D processing. With 3D-UBM, it will be possible for the first time to visualize the Schlemm's canal and obtain *en face* (facing forward) views of the eye, so it will inform more precise treatments and possibly prevent unnecessary surgeries. With 3D-UBM, images will be acquired by a non-specialist and intuitively interpreted by an ophthalmologist, enabling improved visualization and quicker diagnosis. Also, the software will provide automatic segmentation of eye anatomy and make available improved and new imaging biomarkers involving heat maps and ciliary volume. Last, numerous other clinical applications will be improved with 3D-UBM including cataract, ocular tumors, anterior segment anomalies and intraocular devices.

> Easy-to-use and reimbursable 3D ultrasound for visualizing and diagnosing diseases in the eye. Improves speed, confidence, and success rate when evaluating and treating glaucoma, which could significantly reduce ocular ultrasound costs.
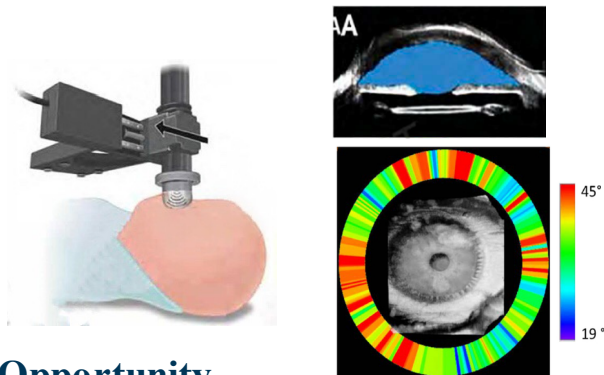
Value Proposition

Preliminary results show 3D-UBM improves speed, confidence, and success rate when used to assess iridocorneal angle heat maps and evaluate the type and severity of glaucoma. It allows clinicians to accurately guide common surgical interventions like laser ablation, which is currently done without direct visualization, thereby improving success rates. It also allows the use of ultrasound without an ultrasonographer, reducing costs. Last, the system will at least be reimbursed at about $100/eye, so the $50,000 system would pay for itself within 6 months.

Opportunity

We seek commercialization partners with a commitment to and leadership position in global health issues. Opportunities for collaboration may take a variety of forms, including the license of IP; participation directly or in conjunction with a private equity investor in a startup to develop and commercialize the technology; sponsored research.

Technology Readiness	Commercial Pathway	Intellectual Property
3D-UBM system is completed and is currently being validated	Available for licensing and/or start-up consideration	2 Filed Patents and several disclosures

Inventors: **Faruk Orge, MD, David Wilson, PhD**

Licensing Contact: **Wayne Hawthorne**
Sr. Licensing Officer | (216) 368-6104 | wayne.hawthorne@case.edu

CASE WESTERN RESERVE UNIVERSITY

CASE-COULTER TRANSLATIONAL RESEARCH PARTNERSHIP