



Department of Biomedical Engineering

香港城市大學
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Label-free 3D Cellular-Resolution Imaging of the Living Human Eye

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Venue: YEUNG-Y5305, 5/F

Yeung Kin Man Academic Building

Abstract

Aging societies such as Hong Kong face a growing burden of age-related eye diseases, including macular degeneration, glaucoma, and diabetic retinopathy. These blinding conditions severely reduce quality of life and impose a heavy burden on families and society.

Early detection is essential to preserve vision, enable timely treatment, and reduce both personal suffering and societal costs. Because these diseases originate at the cellular and molecular levels long before they become detectable with clinical imaging, early detection and precise monitoring require technologies capable of visualizing the 3D microscopic structures of the living human eye, ideally without the need for exogenous labels.

Our Adaptive Optics Optical Coherence Tomography is the only technology that enables label-free, 3D structural and functional imaging of the living human eye at cellular resolution. This technology has the potential to transform ophthalmology by advancing our understanding of disease pathophysiology, enabling early diagnosis of blinding diseases, and improving treatment monitoring to accelerate clinical trials. These advancements will expedite the development of effective therapies, ultimately improving patient care.

I will describe how we advance this technology to address clinical needs and apply it to reveal retinal structures that were previously observable only ex vivo through histology.

Biography

Dr. Yan Liu is a Research Associate at the Indiana University School of Optometry, where his research focuses on developing label-free, high-resolution imaging technologies to study the human eye in vivo at the cellular level. He completed his postdoctoral training with Prof. Changhuei Yang in the Department of Electrical Engineering at the California Institute of Technology (Caltech). Dr. Liu earned his Ph.D. in Biomedical Engineering at Washington University under the mentorship of Prof. Lihong V. Wang, now Professor of Medical Engineering and Electrical Engineering at Caltech. Dr. Liu received his Bachelor's degree from Tsinghua University. For more information, please visit: <https://yan-liu.wixsite.com/mysite>.