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(국문/영문)기타소속:

국문 강연제목: 초고속 OCT 및 AdamW 최적화 기반 임상 적용 가능한 세포 수준 분해능 망막 영상법

영문 강연제목: Clinically Translatable Cellular-Resolution Retinal Imaging Using Multi-MHz SS-OCT and AdamW

Abstract(영문):

Three-dimensional (3D) cellular-resolution imaging of the human retina could revolutionize ophthalmology, revealing pathogenic mechanisms and biomarkers for early diagnosis. However, existing approaches have limited practical utility due to their restricted imaging fields, high cost, and inherent hardware complexity. Here, we demonstrate 3D depth-invariant cellular-resolution imaging of the living human retina over a $3\text{-mm} \times 3\text{-mm}$ field of view using the intrinsically phase-stable multi-MHz retinal swept-source OCT and 3D k-space image processing methods. Single-acquisition imaging of photoreceptor cells, retinal nerve fiber layer, and retinal capillaries is presented across unprecedented imaging fields. The application of the AdamW optimizer to a singular-value-based image sharpness metric enabled quick and accurate estimation of aberration profile. By providing rapidly processed wide-field 3D cellular-resolution imaging in the human retina using a standard point-scan architecture routinely used in the clinic, this platform proposes a strategy for expanded utilization of high-resolution retinal imaging in both research and clinical settings.

Brief Biosketch

ByungKun Lee is an Assistant Professor at the Daegu-Gyeongbuk Institute of Science and Technology.

Prof. Lee received his SB, MEng, and PhD degrees at the Massachusetts Institute of Technology. His doctoral thesis focused on optical coherence tomography techniques for quantitative measurement of total retinal blood flow and high-speed ultrahigh-resolution imaging of the outer retina, under Prof. James G. Fujimoto's supervision. Before joining DGIST, Prof. Lee has worked with Prof. Wang-Yuhl Oh at KAIST as a postdoctoral research associate.