Frontiers in High-Resolution Retinal Imaging

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Abstract

The ability of ophthalmoscopes to resolve microscopic structures in the living human retina has always been limited by aberrations in the eye's optics. In the last decade, advances in the ability to measure and correct for the eye's aberrations with adaptive optics have led to the development of a new generation of ophthalmoscopes that can image eyes with unprecedented resolution and contrast. Adaptive optics imaging now allows for the routine examination of single cells in the eye, such as photoreceptors and leukocytes, providing a microscopic view of the living retina that could previously only be obtained in excised tissue. The ability to see these structures in vivo provides the opportunity to non-invasively monitor normal retinal function, and could enhance our ability to better diagnose retinal diseases and track the progression and efficiency of potential treatments, all at a microscopic spatial scale. This talk will highlight some of the scientific discoveries that adaptive optics has made possible, and will also discuss the development of a confocal scanning laser ophthalmoscope married with adaptive optics to optically section the retina in depth. This instrument provides the ability to obtain real-time, high-resolution reflectance and fluorescence images in vivo in human and animal eyes.

Author Biography

Jason Porter is a post-doctoral research fellow in Dr. David R. Williams' laboratory at the University of Rochester's Center for Visual Science. He received his bachelors, masters and doctoral degrees in optics from The Institute of Optics at the University of Rochester. Dr. Porter has developed technologies used to measure and correct the aberrations of the human eye for conducting research in laser refractive surgery and high-resolution retinal imaging applications in normal and pathological eyes. He will join the College of Optometry at the University of Houston this summer as an assistant professor.

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