

## Plenary Talk – Conferencia Plenaria

Thursday july/4

9:00-9:45 h

Jueves 4/julio

### **Prof. Austin Roorda**

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### **Hacking Human Vision**

Humans possess an exquisite ability to immediately generate rich and accurate percepts of a viewed scene in color, space, motion and depth. The process is so effortless that we often take it for granted, but like most lines of scientific investigation, the closer you look, the more interesting it gets. An ability to hack the visual system and directly control the factors (optical blur, eye motion, activation of three types of cone photoreceptor cells) that govern the sensory inputs that inform our percepts can offer some insight into this remarkable process. Systems that combine adaptive optics, high-speed tracking, and precise aberration-corrected light delivery to the retina allow us to do just that. I will describe our most recent systems, their capabilities and applications. Specifically, I will focus on experiments that investigate spatial vision [the beneficial role of eye motion for visual acuity] and color vision [how signals from the three cone types are used to generate percepts of color]. I will end with some discussion of how these technologies are being translated for clinical applications.

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#### **Short bio:**

Austin Roorda received his Ph.D. from the University of Waterloo in 1996 with joint degrees in Vision Science & Physics. Since that time, Dr. Roorda has been pioneering applications of adaptive optics and ophthalmoscopy, including mapping of the human trichromatic cone mosaic while a postdoc at the University of Rochester, designing and building the first adaptive optics scanning laser ophthalmoscope (AOSLO) at the University of Houston, tracking and targeting light delivery to individual cones in the human eye at UC Berkeley, and being part of the first team to use AO imaging to monitor efficacy of a treatment to slow retinal degeneration. Since 2005, he's been at UC Berkeley where he is a member of the Vision Science, Bioengineering and Neuroscience graduate programs. He is a Fellow of the Optical Society of America, the Association for Research in Vision and Ophthalmology and the American Academy of Optometry. Notable awards are the Distinguished Alumni Award from the University of Waterloo School of Optometry (2007), the Glenn A. Fry Award from the American Academy of Optometry (2009), a John S. Guggenheim Fellowship (2014), an Alcon Research Institute Award (2016) a Leverhulme Visiting Professorship at the University of Oxford and the Rank Prize in Optoelectronics (2024).