

Biography: Krystel Huxlin is the James V. Aquavella professor of ophthalmology and associate chair for research at the Flaum Eye Institute. Part of her research focuses on developing new approaches to induce and study the properties of training-induced visual recovery in humans with blindness caused by visual cortex injury, a condition for which there is currently no rehabilitative treatment. In addition to characterizing the properties of recovery attainable with different visual training paradigms, her team is exploring attentional and other manipulations (e.g. transcranial electrical stimulation, pharmacology) to enhance the recovery potential of the damaged visual system. Functional MRI is then used to study how the remaining cortical circuitry is altered by both damage and subsequently, by visual training. This body of work is intended to improve our understanding of the plasticity inherent in brain-damaged individuals, and how this plasticity can be recruited to recover visual functions. A related research focus studies the interplay between corneal wound healing and optical quality of the eye, the sensory input to the entire visual system. If the cornea is damaged, this impairs all of vision. Using a unique, behaving animal model, Dr. Huxlin studies the relationship between optical aberrations, corneal structure and biology in health and disease. Such complex correlation is essential if we are to gain the knowledge necessary to design better ways of correcting optical aberrations, with minimal side-effects in terms of corneal and ocular health. Finally, by applying the knowledge gained in this work, a safe, non-damaging form of laser refractive correction has been developed. This method, named IRIS, uses a femtosecond laser to alter the cornea's refractive index, altering its light-bending properties. This fully customizable treatment appears to cause no corneal scarring. As such, it opens a new area of theoretical investigations into corneal biology related to laser-tissue interaction, in addition to creating a whole new paradigm for vision correction in humans.