PROJECT GLINT:
Exploring the functionality of the far-peripheral retina

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Abstract: The resurgence of interest in virtual reality has invigorated questions regarding how large a field-of-view is necessary to generate immersive virtual displays. Wide field-of-viewS in contemporary virtual displays and inexpensive graphics computation now mean that photorealistic engaging VR is within reach, if image generation is carefully husbanded and these displays don't make people sick. But even these contemporary displays do not come close to the instantaneous field of view of binocular vision in humans, as even the widest FOVs in current devices are only about 55 degrees in visual eccentricity (110 degrees total field-of-view) or what is thought to be one-half of the total visual field. Important questions remain about the best way to render wide field-of-view images in ways that optimize graphics processing resources while preventing simulator sickness and other adverse phenomena. Better understanding the complex nature of the interaction of foveal, parafoveal and far peripheral retinal stimulation and how we experience that interaction both consciously and subconsciously will fuel the next leap in VR design.

The purpose of the NSF-sponsored GLINT project is to Increase bandwidth to the brain though inconspicuous spatial-temporal simulation of the far peripheral retina. Through a greater understanding of the functional perceptual properties of the peripheral retina at large eccentricities (>100 degrees off-axis) and the processing of those signals in the brain, Prof. Furness and other co-investigators intend to create strategies and demonstrations of a new class of display devices that increase sensory immersion and a sense of presence while reducing the effects of motion sickness and the computational demands to create immersive virtual worlds. Professor Furness will summarize key experimental findings to date from the GLINT project.

Bio: Prof. Furness is an amalgam of Educator, Inventor and Entrepreneur in a professional career that spans 55 years. In addition to his contributions in photonics, electro-optics, and human interface technology, he is an original pioneer of virtual and augmented reality technology and widely known as the 'grandfather' of virtual reality. Tom is currently a Professor of Industrial and Systems Engineering with adjunct professorships in Electrical Engineering and Mechanical Engineering. and Human Centered Design and at the founder and International Director of the family of Human Interface Technology Laboratories at the University of Washington, Christchurch, New Zealand and Tasmania, Australia. He is also the founder and chairman of the Virtual World Society, a non-profit for extending virtual reality as a learning system for families and other humanitarian applications. His current research interests include exploring the functionality of peripheral vision at large eccentricities and investigations into photon emission from the retina. Tom and his students/colleagues have spun off 27 companies with an aggregate market capitalization of >$10B. He is a Fellow of the IEEE.