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Framing a More Immersive World on the Horizon

An Interview with **Niko Troje**, Vision Scientist, York University. Vision: Science to Applications (VISTA)

In vision research, we use pictures a lot in order to study the visual system. We present them on screens or on larger projection surfaces, and we assume that because the stimulation of our eyes under those conditions is similar to what we are experiencing in the real world, that what we are studying can be generalized to a real world that opens in front of our open eyes.

Lately a couple of colleagues have been challenging that assumption. I'm taking that question into virtual reality because in virtual reality, we can compare what I call visual space. So the open space in front of you and pictorial space — the space is depicted on screens and pictures and in movies — directly next to each other.

So we developed a new tool — with the help of VISTA research funds — which is now called the Alberti Frame, making reference to the renaissance architect and mathematician Leon Battista Alberti. A frame that you can place anywhere in virtual reality, and then you can take a picture, and taking a picture means that on what you just sourced with that window is now frozen on a screen, which is spanned by that frame.

Now if you start working with that system and you explore what the differences really are between the two, then you figure that you have to work on what we call binocular disparity: on the one hand stereopsis, the fact that we see things with two eyes on the one hand, and on motion parallax, which means that things move in the retinal image retina, like relative to each other if you make even the slightest lateral sway.

So our Alberti Frame now has not just two states, but it's got four states, so two additional ones in which it either behaves as a window in terms of stereopsis, but like a picture in terms of motion parallax, or the other way around.