

York U conducts vision research using the world's first EGG system



▲ A view into the Christie EGG. This visualization solution enables York U's vision researchers to extend the capabilities of their facility.

If you lose your sense of vision, how do you compensate with other senses? What about reacting to unusual environments such as deep space or deep water? How does your vision give you information that equips you to function within different and constantly changing environments? These are some of the questions that the Centre for Vision Research at Canada's York University seeks to address.

York U's interdisciplinary, collaborative approach to research brings together academics concentrating on all aspects of vision science. Professor Laurence Harris, Department of Psychology, is the Director of the Centre for Vision Research. Professor Harris explains their team's focus, "We're interested in understanding the sensory information we receive from the outside world, and how these senses combine to produce the best estimates of what's going on in the outside world. In particular, we are focused on the vestibular system – it tells us about our balance and motion in the world.

"One of the reasons why we were interested in the Christie® Edgeless Graphics Geometry (EGG) visualization system is that we wanted to look at self-motion through the world and visual vestibular combinations in that multisensory way."

Professor Laurence Harris
York University

The Centre for Vision Research routinely conducts studies using computer screens and head-mounted displays. The researchers also use a multi-sided immersive visual environment; however, this environment has edges where the screens meet, producing undesirable visual stimuli. It's also difficult to track a person's responses using this tool or produce appropriate stereoscopic vision. Head-mounted displays are powerful because the person can walk around while wearing them, but they're relatively slow, have a smaller field of vision and poorer resolution than desired. "In order to overcome some of these limitations, we were looking for a

Customer:
York University

Location:
Toronto, ON

Industry/market:
Higher education
Psychology
Cognitive and behavioural research

- Requirements:**
- Edgeless screen
 - Full field of view coverage
 - High resolution
 - 3D stereoscopic vision
 - Smooth and seamless appearance of blended content across projection array
 - Flexibility in controlling and changing the visual environment
 - Small footprint
 - Ease of use and maintenance

Summary:
York University is able to study subjects in a variety of visual environments using the Christie Edgeless Graphics Geometry (EGG) 3D stereoscopic visualization system, the first of its kind to be used in a research facility.

Products:

- Christie EGG visualization system, includes eight Christie Mirage WU-L projectors

Results:
York University has extended its research capabilities in studying how visual stimuli influence a person's interactions with the world around them. By incorporating the Christie EGG visualization system into their research practices, they have the flexibility to quickly change a subject's visual environment and easily track their reactions to difference experiences.

device that would give us a very large field of view, high resolution, good stereoscopic vision over the whole field of view, flexibility in changing the visual environment and could be presented to a subject who was either sitting or standing," says Professor Harris.

Professor Harris and the team from York U saw the Christie EGG visualization system at the Interservice/Industry Training, Simulation and Education Conference (IITSEC). In order to obtain the Christie EGG system, the Centre for Vision Research applied for a grant through the Canadian Foundation for Innovation. When they were awarded the grant, they started discussing customizations and planning the installation with Christie.

The Christie EGG screen in an ellipsoidal shape curves around the observer sitting in the center, to cover their entire field of view. The York U team hadn't found anything comparable in design to the Christie EGG, until that point. It was the only solution that met the team's requirements for a full field of visual stimuli in high resolution with good stereoscopic vision. Professor Harris elaborates, "The human visual field goes out to about 110 degrees in all directions so the Christie EGG design allows us to get to that whole area while giving us complete control to change the visual stimuli quickly and easily. We can move the stimuli relative to the person, we can change various aspects of it such as the contrast and we can change the layout of the objects within the computer graphics program – it gives us great flexibility." One of the biggest advantages of the Christie EGG is that it can produce a stereoscopic signal – a signal for each eye – which more closely replicates what people experience in the real world.

The system is powered by eight Christie Mirage WU-L projectors that are integrated together for a seamless 3D image across the field of view. The projectors are flown and there is a curved screen with a seat that can be adjusted in proximity to the screen.

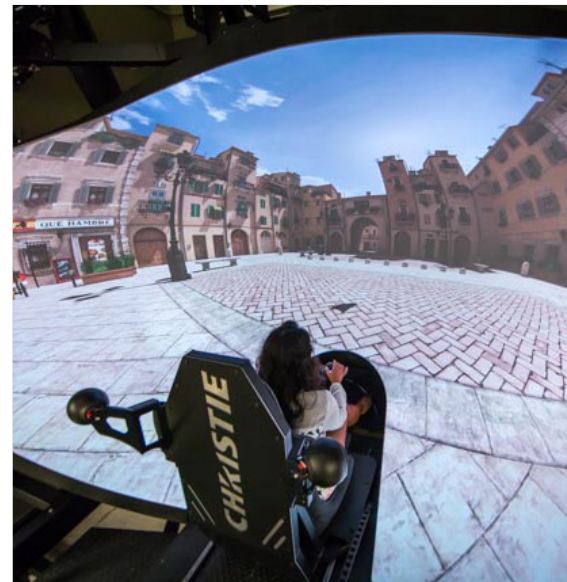
York U worked closely with the Christie team to further customize the system. For their purposes, they wanted the Christie EGG to sit higher on a platform than originally designed so that the seat could be replaced by a treadmill for different types of vision and motion tests. Professor Harris explains the significance, "This will be a key component to studying the maintenance of balance and stable walking for elderly people to better understand the cues they use to stay upright and avoid falling. One of the cues has to do with peripheral vision which hasn't been studied thoroughly yet. This is something we will be tackling in our research."

The Christie EGG has allowed the Centre for Vision Research at York U to conduct novel experiments that couldn't be done any other way using their existing tools. It also allows the team to collaborate with professors from across York U and from other universities. For example, the team will be working with members of the University of Ontario Institute of Technology who are working on gaming for training purposes in fields such as emergency response and nursing. In partnership with the University of Waterloo, they'll be studying aging, balance and stability. These projects are adding to the strength of York U as a hub for research since the Christie EGG is the only functioning system of its kind within a research facility in the world.

As the team works with the Christie EGG, they will continue to look for ways they can use the system to extend their research and their contributions to the study of vision and motion.

Contact Christie

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▲ York U researchers are able to produce stereoscopic vision and use shutter glasses within the Christie EGG to create an accurate 3-dimensional experience.



▲ Creating a completely visually-immersive environment, the Christie EGG solution allows the Centre for Vision Research to conduct experiments that couldn't be done previously.

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