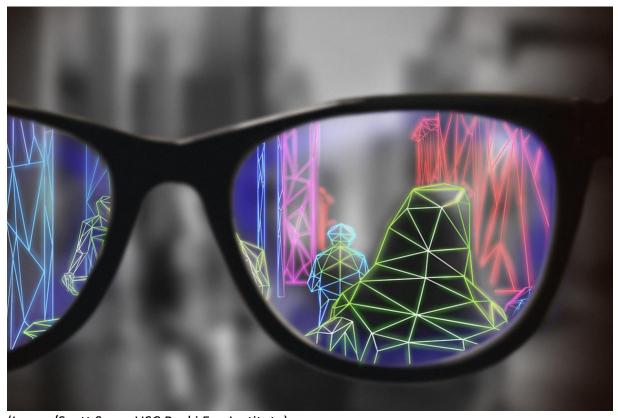**Researchers at the USC Ginsburg Institute for Biomedical Therapeutics develop augmented reality glasses to help low-vision patients navigate their environments**

By Alexandra Demetriou

A team of researchers at the USC Dr. Allen and Charlotte Ginsburg Institute for Biomedical Therapeutics recently developed a pair of augmented reality (AR) glasses to help visually impaired patients navigate their surroundings and perceive depth more clearly.

The glasses were designed to help patients with a degenerative eye disease called Retinitis Pigmentosa (RP). The condition causes progressive vision loss, particularly on the periphery of one's vision, and makes it difficult to see in low-light conditions. Patients with RP often experience tunnel vision and have trouble perceiving their 3D environment. Specifically, they struggle to grasp objects and avoid obstacles in their path, and these issues are worse at night.

The AR glasses help solve this problem by allowing patients to see a color-coded mesh on top of the objects in their surroundings. The colors correspond to depth, with objects closest to the wearer appearing white, followed by green, blue and eventually red for objects that are furthest away.

(Image/Scott Song, USC Roski Eye Institute)

The device, customized by Anastasios Nikolas Angelopoulos and Dr. Mark Humayun, was configured with the user's experience in mind. Rather than using virtual reality, which completely replaces the wearer's field of view with an image on a screen, the augmented reality color mesh enhances the wearer's depth perception while still allowing the patient to see the true color and texture of an object through gaps in the mesh. This is important for patients, because it allows them to interact with the world around them as normally as possible without having to sacrifice any of the perception they still have.

With the help of their colleagues, Drs. Hossein Ameri and Debbie Mitra, the researchers tested the visual aid in subjects with retinitis pigmentosa. The team asked patients to both navigate a simple obstacle course and grasp objects in front of them while they had the glasses on. When using the glasses, RP patients were able to navigate the maze and avoid obstacles 50% better than they could without the visual aid. The grasping task required patients to grab the furthest of four pegs placed in front of them, without hitting any of the closer ones. The glasses improved the patients' abilities to grasp the furthest peg by 70%, meaning that much of their depth perception was restored thanks to the AR color mesh.

Currently, many patients with RP avoid going out at night and may experience anxiety or fear of losing their independence due to their vision problems. Although the device is still in development, the researchers hope these glasses will eventually help improve quality of life by allowing patients to return to their day-to-day activities safely and with more confidence and independence.

This advancement was recently featured in *ScienceDaily*. To read the full story, click here.