Recent progress on super-multi-view and holographic near eye displays

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Super-multi-view (SMV) and holographic near eye displays (NEDs) provide three-dimensional (3D) images with full depth cues, overcoming the vergence-accommodation conflict of traditional stereoscopic displays. In this talk, we introduce our recent progress on the SMV and holographic display techniques for the NED application. For the SMV NED, we show that the use of the ferroelectric liquid crystal on silicone (FLCoS) spatial light modulator with a LED array light source can be used in the implementation of the waveguide-type SMV NED. The fast refresh rate of the FLCoS enables the real-time operation of the SMV NED with 2x2 viewpoints within the eye pupil. For the holographic NED, we introduce our foveated display configuration. Two spatial light modulators are configured with a polarization dependent lens, giving two holographic 3D images with different magnifications. The use of the polarization dependent lens reduces the system volume significantly, enabling compact form factor. The optimization of the computer generated hologram suppresses the noise in the reconstruction, enhancing the final 3D image quality. In the presentation, we show the experimental results of our SMV and holographic NEDs and discuss their potentials in AR and VR applications.

Short Bio:

Jae-Hyeung Park earned his B.S., M.S., and Ph.D. degrees from Seoul National University in 2000, 2002, and 2005, respectively. After completing his studies, he joined Samsung Electronics, where he focused on developing motion blur reduction techniques for LCDs. From 2007 to 2012, he served as a faculty member at Chungbuk National University in South Korea. Subsequently, from 2013 to 2023, he held a faculty

position at Inha University in South Korea. In 2024, he became an associate professor at Seoul National University, where he continues to work on the acquisition, processing, and display of three-dimensional information using holography and light field techniques. His recent research focuses on the applications of three-dimensional display techniques to AR and VR glasses and the development of high-quality computer-generated-holograms. Professor Park is a recipient of several awards, including the Merck Young Scientist Award (2015), SID Distinguished Paper Award (2007, 2014), and IEC 1906 Award (2014). He was also awarded a Fellow of Optica in 2022.