From the Topical Issue Editor

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Welcome to the topical issue of 3D RESEARCH on 3D display.

The evolution of 3D display technology was started in the mid nineteenth century with the birth of modern photography and stereoscopy. Then, it was followed by auto-stereoscopic technologies such as integral imaging, volumetric display, holographic display and etc. Now, the ultimate goal of this field is to achieve next-generation 3D imaging and display technologies that could capture and display real 3D images with high resolution at real-time.

In the course of the realization of the next-generation 3D imaging and display technologies, the contributions of this issue will cover various aspects of 3D display. First, Frol Periverzov et al. in "3D Imaging for Hand Gesture Recognition: Exploring the Software-Hardware Interaction of Current Technologies" reviews the recent advances on the hand gesture recognition technologies, which will lead to more intuitive and efficient 3D user interfaces (3DUI). They survey and explore current and emerging 3D imaging technologies, and focus on those that can be used to build interfaces between the users' hands and the machine. The paper by Reza Taherkhani et al. in "Designing a High Accuracy 3D Auto Stereoscopic Eye Tracking Display, using a Common LCD Monitor" describes the design and building of a low cost and practical stereoscopic display that does not need to wear special glasses, and uses eye tracking to give a large degree of freedom to viewer's movement while displaying the minimum amount of information. The contribution by Yang Liu et al., titled "Optimization-based Freeform Shape Reconstruction," proposes a novel method to reconstruct cylinder-like freeform shapes from the parallel projection of their contours. Their implementation of the method produces

results that are consistent with human perception of the curved drawings as 3D shapes. Gen Li et al. in "Viewing quality-enhanced reconstruction of 3-D object images by using a modified computational integral-imaging reconstruction technique" propose a modified computational integral-imaging reconstruction technique to dramatically enhance the viewing quality of the computationally reconstructed object images. For this purpose, a pixel-count matrix is introduced in the computational integral-imaging reconstruction process to calculate the number of overlapped pixels of the projected elemental images in the reconstructed object plane. In the paper titled "Color Asymmetry in 3D Imaging: Influence on the Viewing Experience" by Monika Pölönen et al., twenty participants were asked to view natural stereoscopic still images and evaluate how different combinations of color asymmetries affect the overall viewing experience, the naturalness of the image and the depth perception. As expected, an increase in color asymmetry between the viewer's left-eye and right-eye images decreased the image quality evaluation scores. The paper titled "Numerical reconstruction of full parallax holographic stereo-grams" by Jiyung Park et al. presents a simulator which builds a full parallax holographic stereogram from the perspective images and reconstructs the hologram numerically for any viewer location by using a proposed reconstruction algorithm.

As a final point, I would like to thank all authors, reviewers and Springer staffs for their supports for this topical issue.

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