

SPECIAL ISSUE

EMERGING 3-D IMAGING AND DISPLAY TECHNOLOGIES

Edited by B. Javidi and A. M. Tekalp

789 Holographic and Light-Field Imaging as Future 3-D Displays

By J.-Y. Son, H. Lee, B.-R. Lee, and K.-H. Lee

|INVITED PAPER| This paper reviews two of the most active 3-D imaging technologies such as light-field and electroholographic displays, comparing their characteristics and predicting their future perspectives.

805 Enabling Focus Cues in Head-Mounted Displays

By H. Hua

|INVITED PAPER| The nature of vergence–accommodation conflict problem in head-mounted displays and the associated visual artifacts are summarized, followed by a comprehensive review of the various technical approaches toward rendering proper focus cues in head-mounted displays, for both virtual reality (VR) and augmented reality (AR) applications.

825 Recent Advances in the Capture and Display of Macroscopic and Microscopic 3-D Scenes by Integral Imaging

By M. Martínez-Corral, A. Dorado, J. C. Barreiro, G. Saavedra, and B. Javidi

|INVITED PAPER| This paper presents the fundamentals of integral photography and describes the main contributions to its development. Attention is focused also on the recent advances in both macroscopic and microscopic 3-D imaging.

837 Progress Overview of Capturing Method for Integral 3-D Imaging Displays

By J. Arai, E. Nakasu, T. Yamashita, H. Hiura, M. Miura, T. Nakamura, and R. Funatsu

|INVITED PAPER| This paper overviews integral 3-D capturing methods and analyzes integral 3-D imaging technology at its capturing and displaying stages. Approaches for capturing high-resolution integral imaging information are also discussed.

850 Multidimensional Optical Sensing and Imaging System (MOSIS): From Macroscales to Microscales

By B. Javidi, X. Shen, A. S. Markman, P. Latorre-Carmona, A. Martínez-Uso, J. Martínez Sotoca, F. Pla, M. Martínez-Corral, G. Saavedra, Y.-P. Huang, and A. Stern

|INVITED PAPER| This review paper describes a passive multidimensional optical sensing and imaging system (MOSIS), which can be used for 3-D visualization, seeing through obscurations, material inspection, 3-D endoscopy, and 3-D object recognition from microscales to long-range imaging. The system utilizes time and space multiplexing, polarimetric, temporal, photon flux, and multispectral information to reconstruct multidimensionally integrated scenes.

876 Flat Panel Light-Field 3-D Display: Concept, Design, Rendering, and Calibration

By D. Nam, J.-H. Lee, Y. H. Cho, Y. J. Jeong, H. Hwang, and D. S. Park

|INVITED PAPER| This paper presents an autostereoscopic light-field 3-D display architecture, rendering, and calibration method to provide realistic 3-D visual effects. The developed prototype has almost seamless parallax with a resolution comparable to the conventional multiview displays.

DEPARTMENTS

783 POINT OF VIEW

Should Engineers Be on Tap or on Top?

By H. J. Trussell

786 SCANNING THE ISSUE

Emerging 3-D Imaging and Display Technologies

By B. Javidi and A. M. Tekalp

970 SCANNING OUR PAST

Computerized Dungeons and Randomly Generated Worlds: From *Rogue* to *Minecraft*

By N. Brewer

978 CORRECTION

Corrections to “*De Novo* Annotation of Transposable Elements: Tackling the Fat Genome Issue”

[Jamilloux *et al.*, *Proc. IEEE*, vol. 105, no. 3, pp. 474–481, Mar. 2017, DOI: 10.1109/JPROC.2016.2590833]

By V. Jamilloux, J. Daron, F. Choulet, and H. Quesneville

979 FUTURE SPECIAL ISSUES/SPECIAL SECTIONS

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On the Cover: Our cover this month captures the potential uses of head-mounted displays for applications such as virtual and augmented reality.

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SPECIAL ISSUE: Emerging 3-D Imaging and Display Technologies

892 Numerical Manipulation of Digital Holograms for 3-D Imaging and Display: An Overview

By P. Memmolo, V. Bianco, M. Paturzo, and P. Ferraro

INVITED PAPER This paper reviews the most effective techniques for numerically manipulating digital holograms to achieve improved image reconstructions. The topics of extended focus imaging (EFI), synthesis of 3-D holographic scenes, and enhanced 3-D display are also discussed throughout.

906 Multimodal Imaging Based on Digital Holography

By O. Matoba, X. Quan, P. Xia, P. Peng, Y. Awatsuji, and T. Nomura

INVITED PAPER Imaging techniques using phase, polarization, fluorescence, and spectra based on digital holography are presented in this paper. These techniques are developed for multimodal imaging based on the combination of digital holography and other optical microscopies.

924 Automated Disease Identification With 3-D Optical Imaging: A Medical Diagnostic Tool

By A. Anand, I. Moon, and B. Javidi

INVITED PAPER This paper provides an overview of the development of compact digital holographic microscopes and their applications in 3-D cell imaging, cell parameter extraction, and cell classification for potential automated disease identification.

947 Full-Parallax Holographic Light-Field 3-D Displays and Interactive 3-D Touch

By M. Yamaguchi

INVITED PAPER This paper presents the evolution of light-field 3-D displays, in particular those which employ holographic technology, and their application to 3-D touch interface for intuitive 3-D human-computer interaction.

960 Toward a Flexible, Scalable, and Transparent Thin-Film Camera

By O. Bimber and A. Koppelhuber

INVITED PAPER This paper summarizes the progress toward a first fully transparent, flexible, and scalable thin-film image sensor and reviews lensless imaging approaches.

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