IS&T International Symposium on

Electronic Imaging 2018
SCIENCE AND TECHNOLOGY

28 January – 2 February 2018
Hyatt San Francisco Airport, CA

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EI01: STEREOSCOPIC DISPLAY APPLICATION ISSUES

Instructors: John Merritt, The Merritt Group (US), and Andrew Woods, Curtin University (Australia) | **Sunday January 28**, 8:00 AM – 5:45 PM

Course Level: Intermediate | **Fee:** Member: $485 / Non-member: $535 / Student: $220 (*prices for all increase by $50 after January 8, 2018)

When correctly implemented, stereoscopic 3D video displays can provide significant benefits in many areas, including endoscopy and other medical imaging, remote-control vehicles and telemanipulators, stereo 3D CAD, molecular modeling, 3D computer graphics, 3D visualization, and video-based training. This course conveys a concrete understanding of basic principles and pitfalls that should be considered in transitioning from 2D to 3D displays, and in testing for performance improvements. In addition to the traditional lecture sessions, there is a "workshop" session to demonstrate stereoscopic hardware and 3D imaging/display principles, emphasizing the key issues in an ortho-stereoscopic video display setup, and showing video from a wide variety of applied stereoscopic imaging systems.

Benefits:
- List critical human factors guidelines for stereoscopic display configuration & implementation.
- Calculate optimal camera focal length, separation, display size, and viewing distance to achieve a desired level of depth acuity, as well as comfort limits for focus/fixation mismatch and on-screen parallax values, as a function of focal length, separation, convergence, display size, and viewing distance factors.
- Set up a large-screen stereo display system using AV equipment readily available.
- Evaluate the trade-offs among currently available stereoscopic display technologies for various applications.
- List the often-overlooked side-benefits of stereoscopic displays that should be included in a cost/benefit analysis.
- Calculate and demonstrate the distortions in perceived 3D space due to camera and display parameters.
- Design and set up an orthostereoscopic 3D imaging/display system.
- Understand projective geometry involved in stereo modeling.
- Understand the trade-offs among currently available stereoscopic display system technologies and determine which will best match a particular application.

Intended Audience: Engineers, scientists, and program managers involved with video display systems for applications such as: medical imaging & endoscopic surgery, simulators & training systems, teleoperator systems (remote-control vehicles & manipulators), computer graphics, 3D CAD systems, data-space exploration and visualization, and virtual reality.

Instructors: **John O. Merritt** is a display systems consultant at The Merritt Group, Williamsburg, MA, with more than 25 years' experience in the design and human-factors evaluation of stereoscopic video displays for telepresence and telerobotics, scientific visualization, and medical imaging.

Andrew J. Woods is manager of the Curtin HIVE visualization facility and a research engineer at Curtin University's Centre for Marine Science and Technology in Perth, Western Australia. He has more than 20 years of experience working on the design, application, and evaluation of stereoscopic image and video capture and display equipment.

SYMPOSIUM PLENARY TALKS
Monday: Overview of Modern Machine Learning and Deep Neural Networks – Impact on Imaging and the Field of Computer Vision, **Greg Corrado, co-founder of Google Brain and Principal Scientist at Google**

Tuesday: Fast, Automated 3D Modeling of Buildings and Other GPS Denied Environments, **Avideh Zahkor, Qualcomm Chair & Professor at UC Berkeley**

Wednesday: Ubiquitous, Consumer AR Systems to Supplant Smartphones, **Ronald T. Azuma, Intel Labs Researcher and Augmented Reality Pioneer**

SYMPOSIUM HIGHLIGHTS
- 18 conferences featuring 30 keynote talks by world reknown experts
- 3D Theatre
- Tours of Stanford University Labs
- Industry Exhibition
- Meet the Future: Showcase of Student and Young Professional Research
- Demonstration Session
- Poster Session
- Welcome Reception
- Women in Electronic Imaging Breakfast
- Human Vision in Electronic Imaging 30th Year Banquet

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