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Editors

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Introduction

This volume celebrates the 25th Anniversary of the Conference on Human Vision and Electronic Imaging (HVEI). Over the years, HVEI has become an intellectual beacon for multidisciplinary research on how humans perceive and interact with electronic media. The papers in this conference are written by scientists trained in sensory psychophysics, perception, and cognition, by artists and designers, by domain experts who use imaging to solve real-world problems, and by scientists and engineers trained in image/signal processing, mathematics, computer vision and machine learning. The conference covers the whole range of electronic imaging technologies, including displays, digital compression, digital libraries, 3-D and stereoscopic displays, graphics, data mining and visualization.

This year marks a turning point for HVEI. As electronic media take center stage in the world of commerce, entertainment, medicine, education, finance, and communication, the focus is shifting from the technology, *per se.,* to the interaction between the technology and the human. Increasingly, the focus is on the human who creates, absorbs and interacts with the data produced by these technologies, and with the algorithms that transform it. The human not only judges image quality, but also uses electronic media to find patterns, make decisions, and express creativity. The Conference on Human Vision and Electronic Imaging is dedicated to providing the research and technology to drive this future.

The first two papers in this volume are the keynote presentations, which frame a broad multidisciplinary scope. Jan Koenderink (T.U. Delft) presented a philosophical essay on how our perception of reality is shaped by our *umwelt,* or world view. Don Hoffman (UC Irvine) hypothesized that we are unable to experience the real world veridically, and presented a simulation designed to test this hypothesis. At the conference, the audience also heard presentations by Aude Oliva (MIT), who explored the question of image memorability with experiments using thousands of images on the internet, and by Walter Bender (Sugar Labs), on how research presented at HVEI influenced the design of "One Laptop Per Child," which is not only an inexpensive device, but also, an interactive learning system.

This volume also features ten papers that explore the evolution of key multidisciplinary trends over the past 25 years through the lens of HVEI. These surveys provide a conceptual and historical backdrop for each major "theme," and explore opportunities and challenges for the future. Several papers examine fundamental and applied issues at the intersection between technology and research in color vision (Mc Cann), feature perception (Rogowitz), texture analysis

(Pappas), natural image statistics (Dorr, Vig, and Barth), and eye movements (Tyler). Several papers provide a tour of early-vision issues in image quality and coding (Haun and Peli; Ahumada and Watson), complemented by two papers examining higher-level issues in image quality (Heynderickx, and de Ridder; Federovskaya and de Ridder). The final theme paper focuses on research driven by emerging technologies (Rising) and aesthetics. This volume also includes three invited papers-- on lightness perception in imaging and art (Gilchrist), on novel high-level adaptation effects (Webster) and on the co-evolution of the technologies for producing visual stimuli and the problems they were invented to explore (Westheimer).

The peer-reviewed contributed papers in the proceedings support the major themes above and also help shape directions for HVEI in the years ahead. One emerging theme is the technology, psychology, and aesthetics of art and design, which ran through the conference and culminated in a session on Art and Perception. Another is visual attention, which plays a major role in research on image quality and coding. This year, there are several papers which expand the scope to include the allocation of attention in 3-D environments and complex real-world settings.

Looking back over the history of the Conference on Human Vision and Electronic Imaging, we are proud of the truly multi-disciplinary community that it has fostered. As many of the theme papers reveal, career-changing insights were experienced at HVEI, resulting in new fundamental scientific results and new technologies. We are proud that the conference has introduced scientists, engineers, and artists who might never have met each other had it not been for HVEI, and we are proud of all the collaborations that have sprung from this venue. By focusing on discussion and interaction, and by being ferociously inclusive, the Conference on Human Vision and Electronic Imaging continues to be a place where creative professionals from a wide range of disciplines, geographies, and perspectives come to learn, share, and be inspired.

Please come visit our website: http://hvei.eecs.northwestern.edu

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