



## Tutorial: Perceptually-Motivated Graphics

**Date:** Monday, April 14<sup>th</sup>

**Time:** 14:00 - 17:30 (Half-day Tutorial)

### Presenters:

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**Abstract:** In this half-day tutorial, we give an overview of the uses of knowledge about the human visual system, as applied to several aspects of computer graphics. In particular, we show how human visual perception applies to the optimization of rendering algorithms, display algorithms, as well as virtual environments. Examples are shown for applications such as real-time rendering, high quality rendering, material editing using images, and training and knowledge transfer in virtual environments. The aim is to show that the human visual perception literature harbours a rich source of knowledge that can be directly applied to improve a wide range of algorithms and technologies in computer graphics.

To fully appreciate this tutorial, attendees are expected to have basic knowledge of rendering algorithms, display technologies, as well as virtual environments. No knowledge of human vision or psychophysics is assumed.



## Tutorial: Perceptually-Motivated Graphics

**Katerina Mania** received her Ph.D in Computer Science from the University of Bristol in 2001 which was fully funded by Hewlett Packard Laboratories. Prior to that, she worked at HP Labs as a member of technical staff from 1996-1998. She was appointed as a Lecturer in Multimedia Systems at the University of Sussex, UK (Department of Informatics, 2001-2005) and currently serves as an Assistant Professor in the Department of Electronic and Computer Engineering of the Technical University of Crete, Greece since December 2005. In 2003 she worked on perceptual sensitivity to tracking latency at NASA Ames Research Centre, USA.

Exploiting fundamental memory research, she explores how “close” photorealistic simulations for training are compared with their real-world counterpart, from a cognitive rather than a physics point of view. She is currently working on perceptually-based real time selective rendering algorithms, on visualizing uncertainty in archaeological reconstructions based on possibility theory, on real-time embodiment in virtual spaces based on non-invasive sensor data for mapping user states (emotional, physical) to the dimensions of form, colour, sound and movement, on ubiquitous computing and multimodal interfaces for interacting with digital heritage artifacts and on synthetic facial emotion cues.

Dr Katerina Mania currently serves as one of the Associate Editors for Presence, Teleoperators and Virtual Environments (MIT Press) as well as for ACM Transactions on Applied Perception.

**Erik Reinhard** received his Ph.D. in Computer Science from the University of Bristol in 2000. Afterwards he was a post-doctoral researcher at the University of Utah (2000-2002) and assistant professor at the University of Central Florida (2002-2005). He started a lectureship at the University of Bristol in January 2006, and is currently senior lecturer (associate professor) at the same university.

His work focuses on rendering and display algorithms, with a particular interest in the application of perceptual knowledge in these areas of computer graphics. He has published several psychophysical investigations in premier venues such as SIGGRAPH, ACM Transactions on Applied Perception, and the ACM SIGGRAPH Symposium on Applied Perception in Graphics and Visualization (APGV). In addition, he was the lead author on the first book on high dynamic range imaging (with Greg Ward, Sumanta Pattanaik, and Paul Debevec), and is currently finalising a second book on color imaging. Both books directly relate perceptual issues to display algorithms, as well as other applications in computer graphics.

Further, he founded ACM Transactions on Applied Perception with Heinrich Buelthoff, and is editor-in-chief of this journal. He also acted as programme co-chair for APGV in 2006 with Bill Thompson. Finally, Erik is member of the CIE Technical Committee TC8-08, “Testing of Spatial Colour Appearance Models”, dealing with the specification of a procedure to validate tone reproduction operators.