



IEEE  
**Computer Graphics**  
AND APPLICATIONS

July/August 2016

**QUALITY  
ASSESSMENT  
AND  
PERCEPTION**  
IN COMPUTER GRAPHICS

 **IEEE**

IEEE  computer society

CELEBRATING 70 YEARS

# IEEE Computer Graphics AND APPLICATIONS

July/August 2016 ■ Volume 36, Number 4 ■ Published by the IEEE Computer Society

## Quality Assessment and Perception in Computer Graphics

### 21 Guest Editors' Introduction

*Guillaume Lavoué, Hantao Liu, Karol Myszkowski, and Weisi Lin*

The perceptual computer graphics domain is a rich research area, and the understanding of human vision mechanisms and their integration in the computer graphics processes are becoming increasingly crucial in most applications.

### 23 Applying Computational Aesthetics to a Video Game Application Using Machine Learning

*Ali Naci Erdem and Ugur Halici*

Employing a computational aesthetics approach via a regression machine learning model, the authors show that a near-real-time aesthetic analysis and visual improvement are possible using a virtual camera director.

### 34 Predicting Moves-on-Stills for Comic Art Using Viewer Gaze Data

*Eakta Jain, Yaser Sheikh, and Jessica Hodgins*

The move-on-stills technique allows still images of various sizes to be retargeted to fixed-size digital screens via camera moves. Considering the problem of computationally predicting the parameters of a good move-on-still, the proposed algorithm uses viewer gaze to predict camera move parameters for comic art images.

### 46 Measuring the Visual Saliency of 3D Printed Objects

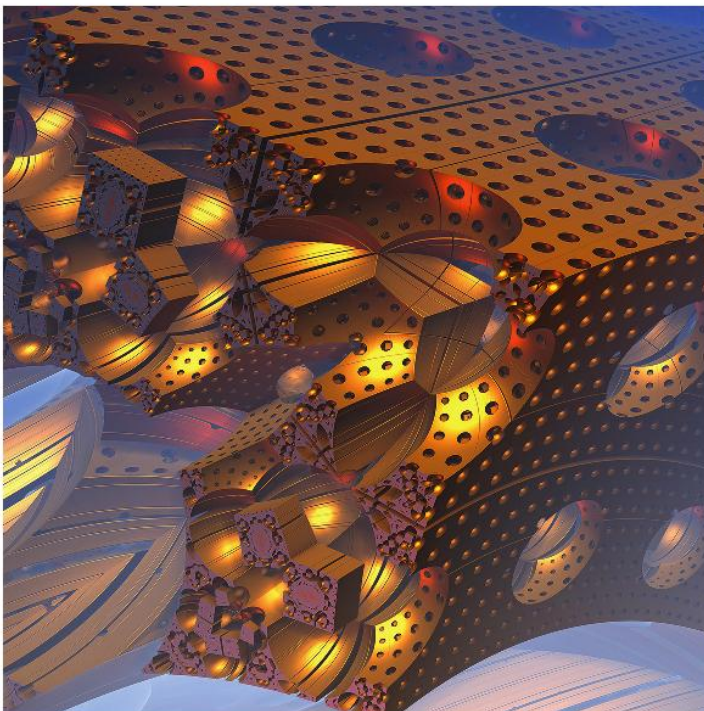
*Xi Wang, David Lindlbauer, Christian Lessig, Marianne Maertens, and Marc Alexa*

In an effort to validate the assumption that the saliency found in flat stimuli can be related to a 3D scene, the authors set up an experiment that examines if visually salient features exist for genuine 3D stimuli. They then validate computational models for the visual saliency of 3D objects.

### 56 The Accuracy of Gauge-Figure Tasks in Monoscopic and Stereo Displays

*Matthias Bernhard, Manuela Waldner, Paskal Plank, Veronika Soltészová, and Ivan Viola*

The gauge-figure task is a widespread method used to study surface perception for evaluating rendering and visualization techniques. This article investigates how accurately slant angles probed on well-defined objects align with the ground truth in monoscopic and stereoscopic displays to assess the probing bias.



Cover Art: Space Junk, © 2015 Lyle Hatch.

ISSN 0272-1716



## Feature Articles

### 67 A Comparison of Health Visualization Evaluation Techniques with Older Adults

Thai Le, Hilaire J. Thompson, and George Demiris

Aging-associated changes in visual acuity, cognition, and motor control in addition to attitudinal and affective perceptions of technology impact the design of information systems for older adults. In an effort to evaluate interactive health visualizations with older adults, the authors applied and compared benchmark, insight, and subjective usability questionnaire evaluation methods.

### 78 A Gamut-Mapping Framework for Color-Accurate Reproduction of HDR Images

Elena Šikudová, Tania Pouli, Alessandro Artusi, Ahmet Oğuz Akyüz, Francesco Banterle, Zeynep Miray Mazlumoglu, and Erik Reinhard

An integrated gamut- and tone-management framework for color-accurate reproduction of high dynamic range images can prevent hue and luminance shifts while taking gamut boundaries into consideration. The proposed approach is conceptually and computationally simple, parameter-free, and compatible with existing tone-mapping operators.

## Departments

### 4 About the Cover

#### Improvising in Three Dimensions

Gary Singh

### 6 Tools & Products

#### Art in the Digital Age

Lisa Avila



Page 34

### 8 Visualization Viewpoints

#### Topic- and Time-Oriented Visual Text Analysis

Wenwen Dou and Shixia Liu

### 14 Applications

#### Precision Agriculture: Using Low-Cost Systems to Acquire Low-Altitude Images

Moacir Ponti, Arthur A. Chaves, Fábio R. Jorge, Gabriel B.P. Costa, Adimara Colturato, and Kalinka R.L.J.C. Branco

### 92 Dissertation Impact

#### The PhD Thesis Deconstructed

Stuart K. Card

### 102 Art on Graphics

#### Designing for Insight: A Case Study from Tennis Player Analysis

Kim Albrecht and Burcu Yucesoy

CG&A Call for Papers, inside front cover & p. 91

Product and Advertiser Information, p. 101

Computer Society Information, inside back cover