

# **Twentieth Color and Imaging Conference 2012**

## **Color Science and Engineering Systems, Technologies, and Applications**

**Los Angeles, California, USA  
12-16 November 2012**

**ISBN: 978-1-62993-216-3  
ISSN: 2166-9635**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2012) by the Society for Imaging Science & Technology  
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact the Society for Imaging Science & Technology  
at the address below.

Society for Imaging Science & Technology  
7003 Kilworth Lane  
Springfield, Virginia 22151

Phone: 703-642-9090  
Fax: 703-642-9094

[info@imaging.org](mailto:info@imaging.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>Creating Photoreal Digital Actors: Capturing Light and Reflectance</b> .....	1
<i>Debevec, Paul</i>	
<b>Visual Attention Based Surveillance Videos Compression</b> .....	2
<i>Guraya, Fahad Fazal Elahi; Medina, Victor; Cheikh, Faouzi Alaya</i>	
<b>Improved Video Compression Using Perceptual Modeling</b> .....	9
<i>Shaw, Mark Q.; Parra, Albert; Allebach, Jan P.</i>	
<b>Boosting Luminance of a Colour-Sequential Display</b> .....	15
<i>Hammer, M.; Hinnen, K. J. G.; Langendijk, E. H. A.</i>	
<b>CIC@20: The Continuing “Tale of Two Paradigms”</b> .....	21
<i>McCann, John J.</i>	
<b>A Large-Scale Multi-Lingual Color Thesaurus</b> .....	30
<i>Lindner, Albrecht; Li, Bryan Zhi; Bonnier, Nicolas; Süsstrunk, Sabine</i>	
<b>Games with Hypotheses: Color, Text and Texture</b> .....	36
<i>Moroney, Nathan; Süsstrunk, Sabine</i>	
<b>The Role of Bright Pixels in Illumination Estimation</b> .....	41
<i>Joze, Hamid Reza Vaezi; Drew, Mark S.; Finlayson, Graham D.; Rey, Perla Aurora Troncoso</i>	
<b>Scene Illuminant Estimation of Multiple Light Sources</b> .....	47
<i>Tominaga, Shoji; Horiuchi, Takahiko; Kato, Yu</i>	
<b>Reducing Worst-Case Illumination Estimates for Better Automatic White Balance</b> .....	52
<i>Mosny, Milan; Funt, Brian</i>	
<b>Spectral Representation of Object Colours</b> .....	57
<i>Chou, Yi-Fan; Cheung, Vien; Luo, M Ronnier; Lee, San-Liang</i>	
<b>Improvement of Camera Characterization Process for Different Capturing Geometries Using Saunderson Surface Correction</b> .....	63
<i>Abed, Farhad Moghareh; Berns, Roy S.; Masaoka, Kenichiro</i>	
<b>Simulation of Image Detail Visibility using Contrast Sensitivity Functions and Wavelets</b> .....	70
<i>Pedersen, Marius; Farup, Ivar</i>	
<b>A Closed Form Solution for the Brightness Preserving Colour to Greyscale Image Conversion</b> .....	76
<i>Finlayson, Graham D.; Matheson, Toby N.</i>	
<b>Webcam Based Display Calibration</b> .....	82
<i>Thomas, Jean-Baptiste; Gerhardt, Jérémie</i>	
<b>A LUT-based Method for Recovering Color Signals from High Dynamic Range Images</b> .....	88
<i>Hirai, Keita; Tominaga, Shoji</i>	
<b>Ascertainment of Perceptual Classification for Material Appearance</b> .....	94
<i>Yamamoto, Shoji; Sawabe, Masashi; Hosokawa, Natsumi; Yamauchi, Yasuki; Tsumura, Norimichi</i>	
<b>Evaluation of Authenticity by Perception-based Rendering for a Reflected Image</b> .....	100
<i>Hosokawa, Natsumi; Yokoya, Mayu; Yamamoto, Shoji; Tsumura, Norimichi</i>	
<b>Removing Outliers in Illumination Estimation</b> .....	105
<i>Funt, Brian; Mosny, Milan</i>	
<b>Realtime Estimation of Illumination Direction for Augmented Reality on Mobile Devices</b> .....	111
<i>Arief, Ibrahim; McCallum, Simon; Hardeberg, Jon Yngve</i>	
<b>A Six-band Stereoscopic Video Camera System for Accurate Color Reproduction</b> .....	117
<i>Tsuchida, M.; Sakai, S.; Miura, M.; Ito, K.; Kawanishi, T.; Kashino, K.; Yamato, J.; Aoki, T.</i>	
<b>Illumination-Invariant Target Color Detection for EMCCD Camera</b> .....	123
<i>Kang, Min-Sung; Oh, Chang-Beom; Sohn, Kwang-Hoon</i>	
<b>Optimization of Sparse Color Correspondences for Color Mapping</b> .....	128
<i>Hasan, Sheikh Faridul; Stauder, Jurgen; Treméau, Alain</i>	
<b>Seeing Virtual Objects: Simulating Reflective Surfaces on Emissive Displays</b> .....	135
<i>Darling, Benjamin A.; Ferwerda, James A.</i>	
<b>Toward a Perceptually Based Metric for BRDF Modeling</b> .....	142
<i>Fores, Adria; Ferwerda, James; Gu, Jinwei</i>	
<b>Selective Skin Tone Reproduction based on Multiple Preferred Skin Colors</b> .....	149
<i>Kim, Dae-Chul; Kyung, Wang-Jun; Ha, Yeong-Ho</i>	
<b>Progress and Poverty: An Inquiry into Color Appearance Modeling and Increase of Want with Increase of Wealth</b> .....	155
<i>Fairchild, Mark D.</i>	

<b>Automated Pre-processing Method for Dermoscopic Images and its Application to Pigmented Skin Lesion Segmentation</b> .....	158
<i>Madooei, Ali; Drew, Mark S.; Sadeghi, Maryam; Atkins, M. Stella</i>	
<b>Color Hit-or-Miss Transform on Dermatological Images</b> .....	164
<i>Ledoux, Audrey; Richard, Noël; Capelle-Laižé, Anne-Sophie; Fernandez-Maloigne, Christine</i>	
<b>Rendering of Human Teeth and Restorative Biomaterials</b> .....	170
<i>Jung, Jin Woo; Meyer, Gary; DeLong, Ralph; Holmes, Brian N.</i>	
<b>CIC@20: Multispectral Imaging</b> .....	177
<i>Tominaga, Shoji</i>	
<b>Evaluation of Performance of Several Color-Difference Formulae Using a New NCSU Black Experimental Dataset</b> .....	185
<i>Shamey, Renzo; Lin, Juan; Sawatwarakul, Weethima; Fang, Gang</i>	
<b>Analysis and Correction of the Joensuu Munsell Glossy Spectral Database</b> .....	191
<i>Derhak, Maxim W.; Berns, Roy S.; Derhak, Maxim W.</i>	
<b>CAT02 and HPE Triangles</b> .....	195
<i>Li, Changjun; Luo, M. Ronnier; Melgosa, Manuel</i>	
<b>Visual Appearance of Printed Special Effect Colors</b> .....	200
<i>Kehren, Katharina; Urban, Philipp; Dörsam, Edgar</i>	
<b>Reproduction of Gloss Unevenness on Printed Paper by Reflection Model with Consideration of Mesoscopic Facet</b> .....	206
<i>Takano, Rui; Baba, Kaori; Inoue, Shinichi; Miyata, Kimiyoshi; Tsumura, Norimichi</i>	
<b>Embedding Two-Dimensional Barcodes Into Graphics</b> .....	211
<i>Zhao, Yonghui; Fan, Zhigang</i>	
<b>Simulation of Paper Gloss by Point Spread Function of Specular Reflection</b> .....	216
<i>Baba, Kaori; Takano, Rui; Inoue, Shinichi; Miyata, Kimiyoshi; Tsumura, Norimichi</i>	
<b>Individual Differences in the Assessment of Colour Saturation</b> .....	221
<i>Cho, Yoon-Ji; Ou, Li-Chen; Luo, M. Ronnier</i>	
<b>Perception of the Color Change of Temporally Modulated Stimuli</b> .....	226
<i>Yamauchi, Yasuki; Itayama, Takuya; Hirasawa, Masakatsu</i>	
<b>Image-Difference Measure Optimized Gamut Mapping</b> .....	230
<i>Preiss, Jens; Urban, Philipp</i>	
<b>Angular Variations of Reflectance and Fluorescence from Paper - The Influence of Fluorescent Whitening Agents and Fillers</b> .....	236
<i>Johansson, Niklas; Andersson, Mattias</i>	
<b>How do Major Color-Difference Formulae Perform in the High Chroma Blue Region?</b> .....	242
<i>Shamey, Renzo; Cao, Renbo; Zaidy, Syed Shahzad Hussain; Lin, Juan; Lee, Seung Geol</i>	
<b>Model-based Local Contrast Enhancement for Magnified Images</b> .....	248
<i>Kim, Youn Jin; Park, Seung Ran</i>	
<b>Color Correction in Whole Slide Digital Pathology</b> .....	253
<i>Murakami, Yuri; Gunji, Hikaru; Kimura, Fumikazu; Yamaguchi, Masahiro; Yamashita, Yoshiko; Saito, Akira; Abe, Tokiya; Sakamoto, Michiie; Bautista, Pinky A.; Yagi, Yukako</i>	
<b>20 Years of Colour Appearance Research at CIC</b> .....	259
<i>Luo, M. R.</i>	
<b>Making the Calculation of Logvinenko's Coordinates Easy.</b> .....	264
<i>Finlayson, Graham D.; Mackiewicz, Michal; Hurlbert, Anya</i>	
<b>Analysis of Irregular Sampling for Color Interpolation</b> .....	270
<i>Koh, Kok-Wei; Moroney, Nathan; Gottwals, Melanie</i>	
<b>The Challenge of our Unknown Unknowns</b> .....	275
<i>Hunt, Robert W. G.</i>	
<b>Deriving Appearance Scales</b> .....	281
<i>Fairchild, Mark D.; Heckaman, Rodney L.</i>	
<b>The Number of Discernible Object Colors is Unknown</b> .....	287
<i>Masaoka, Kenichiro; Berns, Roy S.; Fairchild, Mark D.; Abed, Farhad Moghareh</i>	
<b>Two-Color System by Red/Cyan Projections Not Land</b> .....	293
<i>Kotera, Hiroaki</i>	
<b>A Life in Color: Louis Silverstein's Contributions to Color Displays</b> .....	299
<i>Farrell, Joyce</i>	
<b>Optimal Daltonization by Spectral Shift for Dichromatic Vision</b> .....	302
<i>Kotera, Hiroaki</i>	
<b>Luminance-Brightness Discrepancy in Near White Lights</b> .....	309
<i>Choi, Seo Young; Park, Du Sik; Kim, Chang Yeong; Schanda, Janos; Csuti, Peter; Kranicz, Balazs</i>	

<b>To Predictability and Beyond: 20 Years of Color Printing at CIC</b> .....	313
<i>Morovic, Ján</i>	
<b>Gamut Expanded Halftone Prints</b> .....	315
<i>Rossier, Romain; Hersch, Roger D.</i>	
<b>Semantic-Driven Selection of Printer Color Rendering Intents</b> .....	323
<i>Falkenstern, Kristyn; Lindner, Albrecht; Süssstrunk, Sabine; Bonnier, Nicolas</i>	
<b>Spectral Vector Error Diffusion - Promising Road or Dead End?</b> .....	329
<i>Norberg, Ole; Nyström, Daniel</i>	
<b>Revisiting Spectral Printing: A Data Driven Approach</b> .....	335
<i>Morovic, Peter; Morovic, Ján; Arnabat, Jordi; García-Reyero, Juan Manuel</i>	
<b>Author Index</b>	