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Measuring, Modeling and Reproducing Material Appearance 2016

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Introduction

The rapid and continuous development of rendering devices such as displays and printers offers interesting challenges related to how materials are understood. Over the years, researchers from different disciplines have studied the interaction of incident light with the texture and surface geometry of a given object, as well as the optical properties of distinct materials. Thanks to those efforts, we have been able to render with high accuracy 2.5D and 3D objects and scenes. But given the day-to-day technological improvements of materials and devices along with the advances in the areas of visual and tactile perception, modeling how light interacts with materials, and techniques for measuring material properties, the field of material appearance is in constant evolution. This conference offers the possibility to share research results and establish new collaborations among academic and industrial researchers from these related fields. Papers are solicited in, but not limited to, the following categories:

• Methods for measuring material properties: measurement of Bidirectional Reflectance Distribution Functions (BRDF), Bidirectional Texture Functions (BTF) and Bidirectional Surface Scattering Reflectance Distribution Function (BSSRDF); estimation of material difference perception; evaluation of metallic coatings/inks; measurement of glossiness; estimation of texture perception; data acquisition methods for different types of materials.

• Models for distinct characteristics of materials: modeling of Bidirectional Reflectance Distribution Functions (BRDF), Bidirectional Texture Functions (BTF) and Bidirectional Surface Scattering Reflectance Distribution Function (BSSRDF); modeling material difference perception; appearance modeling of glossiness and texture; modeling of varnish and special effects inks; softproofing methods for 2.5D and 3D printing.

• Material reproduction aspects: quality evaluation of 2.5D and 3D soft- and hard-copy reproductions (display and printing); estimation of effects of environmental aspects in material perception (lighting, observers' position, printing media); estimation of sensory input (visual, touch, audio) effect in material perception; evaluation of aesthetic aspects of 2.5D and 3D soft- and hardcopy reproductions (display and printing); saliency of 2.5D and 3D soft- and hard-copy reproductions (display and printing); imaging and perception of metallic and effect coatings/inks; saliency, quality, and aesthetics in appearance reproduction; spectral reproduction.

Photo: Dietmar Wueller.

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Monday, February 15, 2016

Keynote: Computational Imaging for Inverse Scattering
Session Chair: Philipp Urban, Fraunhofer IGD (Germany)
8:50 – 9:50 am
Continental Ballroom 2

MMRMA-354
Computational imaging for inverse scattering, *Ioannis Gkioulekas[1], Kavita Bala[2], Frédo Durand[3], Anat Levin[4], Shuang Zhao[5], and Todd Zickler[1]; [1]Harvard University (USA), [2]Cornell University (USA), [3]Massachusetts Institute of Technology (USA), [4]The Weizmann Institute of Science (Israel), and [5]University of California, Irvine (USA)*

Measuring

Session Chair: Maria Ortiz Segovia, Océ - Canon Group (France)

9:50 – 10:10 am
Continental Ballroom 2

MMRMA-355
Trichromatic reflectance capture using a tunable light source: Setup, characterization and reflectance estimation, *Tejas Tanksale and Philipp Urban, Fraunhofer IGD (Germany)* 2

10:10 – 10:50 am Coffee Break

Measuring (continued)

Session Chair: Greg Ward, Dolby Laboratories (USA)

10:50 am – 12:30 pm
Continental Ballroom 2

10:50 MMRMA-356
BRDF interpolation using anisotropic stencils, *Radomir Vavra and Jiri Filip, Inst. of Information Theory and Automation of the CAS (Czech Republic)* 9

11:10 MMRMA-357
3D scanner characterisation for open design, *Fabrizio Valpreda[1] and Paola Iacomussi[2]; [1]Politecnico di Torino and [2]INRIM (Italy)* 15

11:30 MMRMA-358
Learning optimal incident illumination using spectral BRDF images for material classification (JIST-first), *Sandra Skaff, Siu-Kei Tin, and Manuel Martinello, Canon USA (USA)* 21

11:50 MMRMA-359
Multispectral BRDF measurements on anisotropic surfaces: Application to structured metallic surfaces and the aspect simulation of OLED displays, *Pierre Boher, Thierry Leroux, Thibault Bignon, and Véronique Collomb-Patton, ELDIM (France)* 30

12:10 MMRMA-360
Image based reflectance measurement based on camera spectral sensitivities, *Aditya Sole[1], Ivar Farup[1], and Shoji Tominaga[2]; [1]Gjøvik University College (Norway) and [2]Graduate School of Advanced Integration Science, Chiba University (Japan)* 37

12:30 – 2:00 pm Lunch Break

EI 2016 Opening Plenary and Symposium Awards
Session Chair: Choon-Woo Kim (Inha University)
2:00 – 3:00 PM
Continental Ballroom 5

Illuminating a bright future for medicine, *Audrey K. Bowden, Stanford University (USA)* 1

3:00 – 3:30 pm Coffee Break

Reproducing

Session Chair: Ingeborg Tastl, Hewlett-Packard Laboratories (USA)

3:30 – 4:30 pm
Continental Ballroom 2

3:30 MMRMA-361
Relating optical and geometric surface characteristics for gloss management in printing applications (JIST-first), *Teun Baar[1,2], Hans Brettel[1], and Maria Ortiz Segovia[2]; [1]Institut Mines - Télécom and [2]OCE Print Logic Technologies (France)* 45

3:50 MMRMA-362
An exploration of 2.5D printing as tactile pictures, *Carinna Parraman[1] and Maria Ortiz Segovia[2]; [1]University of the West of England (United Kingdom) and [2]Océ Print Logic Technologies SA (France)* 59

4:10 MMRMA-363
Interrelation between gloss and texture perception of 2.5D-printed surfaces, *Teun Baar[1,2], Sepideh Samadzadegan[3], Philipp Urban[4], and Maria Ortiz Segovia[2]; [1]Institut Mines-Télécom; Télécom ParisTech (France), [2]Océ Print Logic Technologies (France), [3]Technische Universität Darmstadt (Germany), and [4]Fraunhofer IGD (Germany)* 60

5:00 – 6:00 pm EI 2016 Symposium Reception

Tuesday, February 16, 2016

Perception in MMRMA

Session Chairs: Mathieu Hebert, Université Jean Monnet de Saint Etienne (France) and Sabine Süsstrunk, EPFL-IC-IVRL (Switzerland)

8:50 – 10:20 am
Continental Ballroom 2

8:50 MMRMA-364
Modeling and estimation for surface-spectral reflectance of watercolor paintings, *Shoji Tominaga and Takahiko Horiuchi, Chiba University (Japan)* 66

9:10 MMRMA-365
Brightness and sparkle appearance of goniochromatic samples, *Paola Iacomussi, Michela Radis, and Giuseppe Rossi, INRIM (Italy)* 72

9:30 MMRMA-366
Perceptual dependencies between texture and color in fabric appearance, *Takafumi Katsunuma, Keita Hirai, and Takahiko Horiuchi, Chiba University (Japan)* 78

9:50 MMRMA-367
Effects of mesoscale surface structure on perceived brightness, *Michael Ludwig and Gary Meyer, University of Minnesota (USA)* 84

10:20 – 10:40 am Coffee Break

Invited Speaker: Refractive Object Reconstruction using Computational Imaging
Session Chair: Francisco Imai, Canon U.S.A. Inc. (USA)
10:40 – 11:20 am
Continental Ballroom 2

MMRMA-368
Refractive object reconstruction using computational imaging, *Gordon Wetzstein, Stanford University (USA)*

Modeling

Session Chair: Susan Farnand, Rochester Institute of Technology (USA)

11:20 am – 12:30 pm
Continental Ballroom 2

11:20 MMRMA-369
Assessing the capacity of a two-flux model to predict the spectral reflectance of stratified coloring coatings, *Mathieu Hebert[1,2], Serge Mazauric[1], and Lionel Simonot[3]; [1]Université Jean Monnet, [2]Institut d'Optique Graduate School, and [3]Université de Poitiers (France)* 91

11:40 MMRMA-370
Fitting analytical BRDF models to low-resolution measurements of light scattered from relief printing samples, *Ni Yan[1], Teun Baar[2], Maria Ortiz Segovia[2], and Jan Allebach[1]; [1]Purdue University (USA) and [2]Océ Print Logic Technologies (France)* 101

12:00 MMRMA-371
Testing spatial patterns for acquiring shape and subsurface scattering properties, *Yitzchak Lockerman, Samuel Brenner, Joseph Lanzone, Alexander Doronin, and Holly Rushmeier, Yale Univ (USA)* 107

12:30 – 2:00 pm Lunch Break

EI 2016 Tuesday Plenary and Symposium Awards
Session Chair: Nitin Sampat (Rochester Institute of Technology)
2:00 – 3:00 PM
Continental Ballroom 5

Pushing computational photography deeper into imaging system design, *Ren Ng, University of California, Berkeley (USA)*

3:00 – 3:30 pm Coffee Break

EI 2016 Symposium Demonstration Session and Exhibit Hall Happy Hour
5:30 – 7:00 PM
Continental Ballroom Foyer