

# Material Appearance Workshop

Monday 21 October 2019

Sorbonne University, Paris

## Program

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8:30 Registrations

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**9:00 Opening speech** By **Mathieu Hebert**, Director of the GDR APPAMAT, **Suzanne Grinnan**, Executive Director of the Society for Imaging Science and Technology, and **Nicolas Bonnier**, General Chair of Color Imaging Conference 2019.

### SESSION 1 – Measurement and characterization

Session chair: Lionel Simonot (Université de Poitiers, France)

**9:15 Keynote: Traceability and references for the measurement of appearance**  
**Gaël Obein** (*Centre National des Arts et Métiers, France*)

**9:40 Bidirectional Reflectance Measurement using Image-Based Measurement Setup**  
A. Sole, I. Farup, P. Nussbaum, S. Tominaga (*Norwegian University of Science and Technology, Norway*).

#### **BRDF characterization of metallized plastics**

T. Fontano<sup>1,2</sup>, J. Audenaert<sup>3</sup>, P. Hanselaer<sup>3</sup>, E. Vesselli<sup>1,4</sup>, S. Paroni<sup>2</sup>, F. Leloup<sup>3</sup> (*1. University of Trieste, Italy; 2. Automotive Lighting Italia S.p.A., Italy; 3. KU Leuven, Belgium; 4. Istituto Officina dei Materiali, Italy*).

#### **Measurement and reproduction of human skin colour**

K. Xiao<sup>1</sup>, M. Pointer<sup>1</sup>, T. Chauhan<sup>2</sup>, S. Wuerger<sup>3</sup> (*1. University of Leeds, United Kingdom; 2. Université de Toulouse, France; 3. University of Liverpool, United Kingdom*)

#### **Manufactured surfaces appearance assessment using Reflectance Transformation Imaging**

A. Zendagui<sup>1</sup>, G. Le-Goic<sup>1</sup>, J.-B. Thomas<sup>3</sup>, Y. Castro<sup>1</sup>, M. Nurit<sup>1</sup>, A. Mansouri<sup>1</sup> (*Université de Bourgogne Franche Comté, France. 2 Norwegian University of Science and Technology, Norway*)

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10:45 Coffee break and poster session

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### Session 2 – Short talks

Session chairs: Mathieu Hébert (Université de Saint-Etienne, France)  
and Myriam Zerrad (Institut Fresnel, France)

**11:15 Keynote: Reproducing Images: Colour and Texture**  
**Carinna Parraman** (*University of West England Bristol, United Kingdom*).

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**11:40 Appearance attributes and factors impacting their perception**

D. Gigilashvili, J. Y. Hardeberg, M. Pedersen (Norwegian University of Science and Technology, Norway).

**Hyperspectral camera calibration and visual color difference metrics**

A. Raza<sup>1,2</sup>, S. Jost<sup>2</sup>, M. Dubail<sup>1</sup>, D. Dumortier<sup>2</sup> (1. Essilor International, France; 2. ENTPE, France).

**Impact of background context for material recognition**

S. Xu, D. Muselet, A. Trémeau (University de Saint-Etienne, France).

**Spectral Impact of Light on Visibility in a Tunnel with Typical Material Reflectances**

D. Talon<sup>1</sup>, D. Dumortier<sup>1</sup>, S. Jost<sup>1</sup>, S. Besson<sup>2</sup> (1. ENTPE, France, 2. CETU, France).

**Optical modelling of transparent nanostructured butterfly wings**

Maëlle Vilbert<sup>1</sup>, Charline Pinna<sup>2</sup>, Christine Andraud<sup>1</sup>, Marianne Elias<sup>2</sup>, Doris Gomez<sup>3</sup> (1. Centre de Recherche sur la Conservation, France; 2. Institut de Systématique, Évolution, Biodiversité, France; 3. Centre d'Écologie Fonctionnelle et Évolutive, France).

**Tailoring the appearance of Ag:TiO<sub>2</sub> nanocomposite films : application to image multiplexing**

N. Dalloz<sup>1,2</sup>, C. Hubert<sup>1</sup>, N. Sharma<sup>2</sup>, M. Hebert<sup>1</sup>, F. Vocanson<sup>1</sup>, S. Ayala<sup>2</sup>, N. Destouches<sup>1</sup> (1. Université de Saint-Etienne, France; 2. HID Global CID SAS, France).

**Use of greyscale voxel values in continuous DLP printing**

R. Tonello<sup>1</sup>, A. Luongo<sup>1</sup>, E. R. Eiriksson<sup>1</sup>, D. B. Pedersen<sup>1</sup>, A. Strandlie<sup>2</sup> and J. R. Frisvad<sup>1</sup> (1. Technical University of Denmark, Denmark; 2. Norwegian University of Science and Technology, Norway).

**Angular reflectance model for ridged specular surfaces, with comprehensive calculation of interreflections and polarization**

D. Saint-Pierre<sup>1</sup>, P. Chavel<sup>1,2</sup>, L. Simonot<sup>3</sup>, M. Hébert<sup>1,2</sup> (1. Université de Saint-Etienne, France; 2. Institut d'Optique Graduate School, France; 3. Université de Poitiers, France).

**Modeling angle-dependent Appearance Reproduction of Inkjet 3D Printer**

J. Yoshii<sup>1</sup>, K. Hirai<sup>1</sup>, W. Arai<sup>2</sup>, S. Kaneko<sup>2</sup>, and N. Tsumura<sup>1</sup> (1. Chiba University, 2. Mimaki Engineering Co., LTD).

**Display of a 2D pattern with an illuminated continuous 3D surface. "Light sculpting"**

L. Brunel (PhotonLyX Technology, Spain).

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12:45 Lunch / Poster session

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**SESSION 3 – Materials and appearance**

Session chair: Nathalie Destouches (Université de Saint-Etienne, France)

**14:00 Keynote: Appearance analysis of fluorescent objects**

Shoji Tominaga (Norwegian University of Science and Technology, Norway)

**14:25 Nanoparticles obtained via solid state dewetting of silver thin films**

I. Gozhyk<sup>1</sup>, P. Jacquet<sup>1,2</sup>, B. Bouteille<sup>1</sup>, R. Podor<sup>3</sup>, J. Ravaux<sup>3</sup>, J. Lautru<sup>3</sup>, R. Dezert<sup>4</sup>, A. Baron<sup>4</sup>, J. Jupille<sup>2</sup>, J. Teisseire<sup>1</sup>, R. Lazzari<sup>2</sup> (1. Lab. Surface du Verre et Interfaces, France; 2. Institut des NanoSciences de Paris, France; 3. Institut de Chimie Séparative de Marcoule, France; 4. Université de Bordeaux; France)

**Dew as a surface iridescence modifier**

C. Ecoffet, B. Leuschel, L. Vonna, O. Soppera (Université de Haute Alsace, France).

**The appearance of film colors**

G. Trumpy (University of Zurich, Switzerland).

**Multi-angle color prediction of anodized titanium**

M. Maillet<sup>1</sup>, Q. Cridling<sup>1,2</sup>, R. Charriere<sup>1</sup>, M. P. Pedferri<sup>2</sup>, D. Delafosse<sup>1,2</sup> (1. Mines Saint-Etienne, France; 2. Politecnico di Milano, Italy).

**Elementary colours**

P. Callet (Centre Français de la Couleur, France).

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15:45 Coffee break and poster session

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## SESSION 4 – Appearance reproduction and rendering

Session chair: Patrick Callet (Centre Français de la Couleur, France)

### 16:15 **Keynote: Multi-material 3D printing for appearance fabrication**

Vahid Babaei (Max Planck Institute for Informatics, Germany)

### 16:40 **Scanning and printing a painting's appearance – from documenting to reconstructing appearance**

W.S. Elkhuisen (Delft University of Technology, Netherlands).

#### **Subvoxel Growth Control in DLP 3D Printing**

A. Luongo, M. B. Doest, V. Falster, M. M. Ribo, E. R. Eiriksson, D. B. Pedersen, J. R. Frisvad (Technical University of Denmark, Denmark).

#### **Real time ray tracing display simulation based on emissive and reflective spectral measurements**

P. Boher<sup>1</sup>, T. Leroux<sup>1</sup>, T. Muller<sup>2</sup>, P. Porral<sup>2</sup> (1. ELDIM, France; 2. United Visual Researchers, France).

#### **Manipulating Object Appearance with Augmented Reality**

M. J. Murdoch (Munsell Color Science Laboratory, USA).

#### **Realistic rendering of automotive product: toward predictive simulation**

Y.R.P. Sortais<sup>1</sup>, S. Azouigui<sup>1</sup>, D. Defianas<sup>2</sup>, G. Sampaio Da Cruz<sup>3</sup>, S. Regnier<sup>3</sup>, B. Deschamps<sup>3</sup> (1. Institut d'Optique, France; 2. PSA, France; 3. Renault, France).

18:00 End

## Posters

### **Versatile image multiplexing by industrial nanosecond laser marking on TiO<sub>2</sub>:Ag nanocomposite films**

— N. Dalloz<sup>1,2</sup>, C. Hubert<sup>1</sup>, N. Sharma<sup>2</sup>, M. Hebert<sup>1</sup>, F. Vocanson<sup>1</sup>, S. Ayala<sup>2</sup>, N. Destouches<sup>1</sup> (1. Université de Saint-Etienne, France; 2. HID Global CID SAS, France).

### **Appearance modification by nano-patterning**

— V. Gâté<sup>1,2</sup>, C. Turbil<sup>1,2</sup>, S. Kolb<sup>2</sup>, D. Turover<sup>1,2</sup> (1. SILSEF, France; 2. NAPA Technologies, France).

### **Light reflection models for V-grooved surfaces**

— D. Saint-Pierre<sup>1</sup>, L. Simonot<sup>2</sup>, M. Hébert<sup>1,3</sup> (1. Université de Saint-Etienne, France; 2. Université de Poitiers, France; 3. Institut d'Optique Graduate School, France).

### **The Art and Science of Foundation Makeup**

— G. Vanderover, C. Ennis, D. DiCanio, C. Fthenakis (Estee Lauder Companies, USA).

### **The boundary integral formalism for the scattering of light from rough multilayers on the 0.4-1 μm band**

— G. Soriano, M. Zerrad, C. Amra (Institut Fresnel, France).

### **Metal-dielectric thin-films for the control of color: application to art and design**

— A. Moreau<sup>1</sup>, A. Echasseriau<sup>2</sup>, F. Lemarchand<sup>1</sup>, R. Shirvinton<sup>1</sup>, and J. Lumeau<sup>1</sup> (1. Institut Fresnel, France; 2. Crafter Studio, France).

### **HDR versus hyperspectral images for applied colour and lighting research**

— S. Jost<sup>1</sup>, C. Cauwerts<sup>2</sup>, A. Raza<sup>1,3</sup> (1. ENTPE, France; 2. Université catholique de Louvain, Belgium; 3. Essilor International, France).

### **Accurate metrology of scattered light**

— M. Zerrad, M. Lequime, M. Fouchier, C. Amra, (Institut Fresnel, France).

### **Display of a 2D pattern with an illuminated continuous 3D surface. "Light sculpting"**

— L. Brunel (PhotonLyX Technology, Spain).

### **Spectral Impact of Light on Visibility in a Tunnel with Typical Material Reflectances**

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### **Use of greyscale voxel values in continuous DLP printing**

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### **Modeling angle-dependent Appearance Reproduction of Inkjet 3D Printer**

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### **Impact of background context for material recognition**

— S. Xu, D. Muselet, A. Trémeau (University de Saint-Etienne, France).

### **High Dynamic Range Reflectance Transformation Imaging: An Adaptive Multi-Light Approach for Visual Surface Quality Assessment**

— M. Nurit<sup>1</sup>, A. Zendagui<sup>1</sup>, Y. Castro<sup>1</sup>, G. Le Goic<sup>1</sup>, H. Favrelière<sup>2</sup>, A. Mansouri<sup>1</sup> (1. Université de Bourgogne Franche-comté, France; 2. Université Savoie Mont-Blanc (USMB), Annecy, France)