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IS&T International Symposium on
Electronic Imaging
SCIENCE AND TECHNOLOGY

26 January 2020 — 30 January 2020 • Burlingame, CA, USA

PROCEEDINGS

Material Appearance 2020

Editors: **Mathieu Hebert**, Université Jean Monnet de Saint Etienne (France),
Lionel Simonot, Université de Poitiers (France),
Ingeborg Tastl, HP Labs, HP Inc. (United States)

These papers represent the program of Electronic Imaging 2020,
held 26 January — 30 January 2020, at the Hyatt Regency San Francisco Airport in Burlingame, CA.

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Material Appearance 2020

Conference overview

The rapid and continuous development of rendering simulators and devices such as displays and printers offers interesting challenges related to how the appearance of materials is understood. Over the years, researchers from different disciplines, including metrology, optical modeling, and digital simulation, 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 propose methods for characterizing the optical and visual properties of many materials, propose affordable measurement methods, predict optical properties or appearance attributes, and render 2.5D and 3D objects and scenes with high accuracy.

This conference offers the possibility to share research results and establish new collaborations between academic and industrial researchers from these related fields.

Award

Best Paper Award

Conference Sponsors

Paper authors listed as of 1 January 2020;
refer to manuscript for final authors.
Titles that are not listed with the proceedings files were presentation-only.

MATERIAL APPEARANCE 2020

Monday, January 27, 2020

Material Appearance 2020 Conference Introduction

Session Chair: Mathieu Hebert, Université Jean Monnet de Saint Etienne (France)

9:20 – 9:30 am
Regency C

KEYNOTE: 3D Digitization and Optical Material Interactions

Session Chair: Ingeborg Tastl, HP Labs, HP Inc. (United States)

9:30 – 10:10 am
Regency C

MAAP-020
Capturing and 3D rendering of optical behavior: The physical approach to realism, *Martin Ritz, deputy head, Competence Center Cultural Heritage Digitizatiion, Fraunhofer Institute for Computer Graphics Research (Germany)*

Biographies and/or abstracts for all keynotes are found on pages 9–14

10:10 – 10:50 am Coffee Break

Sparkle, Gloss, Texture, and Translucency

Session Chair: Mathieu Hebert, Université Jean Monnet de Saint Etienne (France)

10:50 am – 12:10 pm
Regency C

10:50 MAAP-030
One-shot multi-angle measurement device for evaluating the sparkle impression (JIST-first), *Shuhei Watanabe, Ricoh Company, Ltd. (Japan)*

11:10 MAAP-031
Appearance reproduction of material surface with strong specular reflection, *Shoji Tominaga[1,2], Giuseppe Guarnera[2], and Norihiro Tanaka[1]; [1]Nagano University (Japan) and [2]Norwegian University of Science and Technology (Norway)*

11:30 MAAP-032
BTF image recovery based on U-Net and texture interpolation, *Naoki Tada and Keita Hirai, Chiba University (Japan)*

11:50 MAAP-033
Caustics and translucency perception, *Davit Gigilashvili, Lucas Dubouchet, Jon Yngve Hardeberg, and Marius Pedersen, Norwegian University of Science and Technology (Norway)*

DISCUSSION; Material Appearance Morning Q&A

Session Chairs: Mathieu Hebert, Université Jean Monnet de Saint Etienne (France) and Ingeborg Tastl, HP Labs, HP Inc. (United States)

12:10 – 12:30 pm
Regency C

12:30 – 2:00 pm Lunch

PLENARY: Frontiers in Computational Imaging

Session Chairs: Radka Tezaur, Intel Corporation (United States), and Jonathan Phillips, Google Inc. (United States)

2:00 – 3:10 pm
Grand Peninsula Ballroom D

Imaging the Unseen: Taking the First Picture of a Black Hole, *Katie Bouman, assistant professor, Computing and Mathematical Sciences Department, California Institute of Technology (United States)*

For abstract and speaker biography, see page 7

3:10 – 3:30 pm Coffee Break

Aging and Renewing

Session Chair: Shoji Tominaga, Chiba University (Japan)

3:30 – 4:10 pm
Regency C

3:30 MAAP-060
Changes in the visual appearance of polychrome wood caused by (accelerated) aging, *Oleksii Sidorov[1], Jon Yngve Hardeberg[1], Sony George[1], Joshua Harvey[2], and Hannah Smithson[2]; [1]Norwegian University of Science and Technology (Norway) and [2]University of Oxford (United Kingdom)*

3:50 MAAP-061
Image processing method for renewing old objects using deep learning, *Runa Takahashi and Katsunori Okajima, Yokohama National University (Japan)*

DISCUSSION: Material Appearance Afternoon Q&A

Session Chairs: Mathieu Hebert, Université Jean Monnet de Saint Etienne (France) and Ingeborg Tastl, HP Labs, HP Inc. (United States)

4:10 – 4:30 pm
Regency C

5:00 – 6:00 pm All-Conference Welcome Reception

Tuesday, January 28, 2020

7:30 – 8:45 am Women in Electronic Imaging Breakfast; pre-registration required

Skin and Deep Learning — Joint Session

Session Chairs: Alessandro Rizzi, Università degli Studi di Milano (Italy) and Ingeborg Tastl, HP Labs, HP Inc. (United States)

8:45 – 9:30 am
Regency C
This session is jointly sponsored by: Color Imaging XXV: Displaying, Processing, Hardcopy, and Applications, and Material Appearance 2020.

8:45
Conference Welcome

8:50 MAAP-082
Beyond color correction: Skin color estimation in the wild through deep learning, *Robin Kips, Quoc Tran, Emmanuel Malherbe, and Matthieu Perrot, L'Oréal Research and Innovation (France)*

9:10 COLOR-083
SpectraNet: A deep model for skin oxygenation measurement from multi-spectral data, *Ahmed Mohammed, Mohib Ullah, and Jacob Bauer, Norwegian University of Science and Technology (Norway)*

Spectral Dataset — Joint Session

Session Chair: Ingeborg Tastl, HP Labs, HP Inc. (United States)

9:30 – 10:10 am
Regency C
This session is jointly sponsored by: Color Imaging XXV: Displaying, Processing, Hardcopy, and Applications, and Material Appearance 2020.

9:30 MAAP-106
Visible to near infrared reflectance hyperspectral images dataset for image sensors design, *Axel Clouet[1], Jérôme Vaillant[1], and Célia Viola[2]; [1]CEA-LETI and [2]CEA-LITEN (France)*

9:50 MAAP-107
A multispectral dataset of oil and watercolor paints, *Vahid Babaei[1], Azadeh Asadi Shahmirzadi[2], and Hans-Peter Seidel[1]; [1]Max-Planck-Institut für Informatik and [2]Consultant (Germany)*

10:00 am – 7:30 pm Industry Exhibition - Tuesday

10:10 – 10:40 am Coffee Break

Color and Appearance Reproduction — Joint Session

Session Chair: Mathieu Hebert, Université Jean Monnet de Saint Etienne (France)

10:40 am – 12:30 pm
Regency C
This session is jointly sponsored by: Color Imaging XXV: Displaying, Processing, Hardcopy, and Applications, and Material Appearance 2020.

10:40 MAAP-396
From color and spectral reproduction to appearance, BRDF, and beyond, *Jon Yngve Hardeberg, Norwegian University of Science and Technology (NTNU) (Norway)*

11:10 MAAP-120
HP 3D color gamut – A reference system for HP's Jet Fusion 580 color 3D printers, *Ingeborg Tastl[1] and Alexandra Ju[2]; [1]HP Labs, HP Inc. and [2]HP Inc. (United States)*

11:30 COLOR-121
Spectral reproduction: Drivers, use cases, and workflow, *Tanzima Habib, Phil Green, and Peter Nussbaum, Norwegian University of Science and Technology (Norway)*

11:50 COLOR-122
Parameter estimation of PuRet algorithm for managing appearance of material objects on display devices (JIST-first), *Midori Tanaka, Ryusuke Arai, and Takahiko Horiuchi, Chiba University (Japan)*

12:10 COLOR-123
Colorimetrical performance estimation of a reference hyperspectral microscope for color tissue slides assessment, *Paul Lemaillet and Wei-Chung Cheng, US Food and Drug Administration (United States)*

12:30 – 2:00 pm Lunch

PLENARY: Automotive Imaging

Session Chairs: Radka Tezaur, Intel Corporation (United States), and Jonathan Phillips, Google Inc. (United States)

2:00 – 3:10 pm
Grand Peninsula Ballroom D

Imaging in the Autonomous Vehicle Revolution, *Gary Hicok, senior vice president, hardware development, NVIDIA Corporation (United States)*

For abstract and speaker biography, see page 7

3:10 – 3:30 pm Coffee Break

5:30 – 7:30 pm Symposium Demonstration Session

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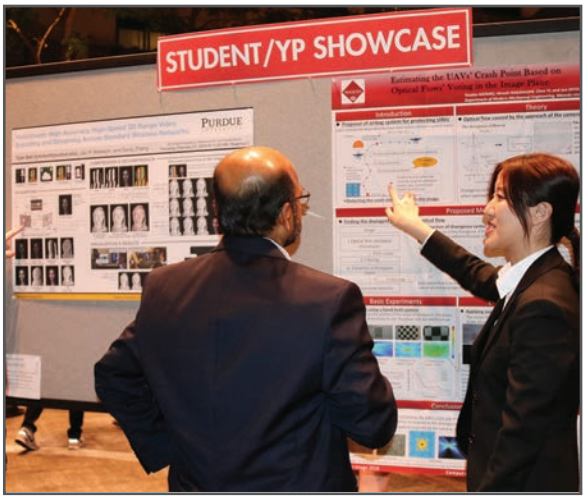

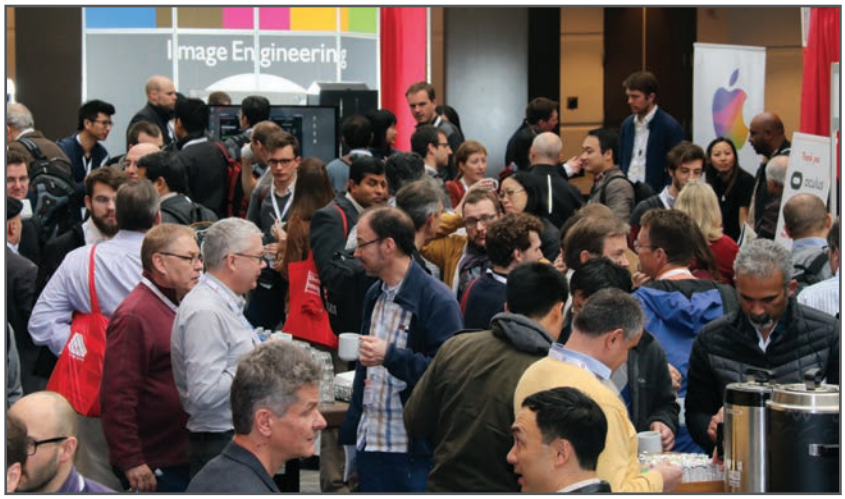

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• INTERACTIVE PAPER SESSION • SPECIAL EVENTS • TECHNICAL SESSIONS •

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