

# **IS&T International Symposium on Electronic Imaging Science and Technology 2016**

Digital Photography and Mobile Imaging  
XII

San Francisco, California, USA  
14 - 18 February 2016

## **Editors:**

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Radka Tezaur  
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## Digital Photography and Mobile Imaging XII

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## Digital Photography and Mobile Imaging XIII

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Monday, February 15, 2016

### DPMI/IQSP: Mobile and Digital Camera Image Quality Evaluation

#### Joint Session

Session Chairs: Joyce Farrell, Stanford University (USA) and Elaine Jin, Intel Corporation (USA)

**10:40 am – 12:30 pm**

Golden Gate 6/7

This session is jointly sponsored by: Digital Photography and Mobile Imaging XII and Image Quality and System Performance XIII.

10:40

#### Conference Opening Remarks

10:50

DPMI-004

**Image stabilization performance – existing standards and the challenges for mobile imaging**, Uwe Artmann and Philipp Feldker, Image Engineering GmbH & Co. KG (Germany)

11:10

DPMI-005

**Image flare measurement according to ISO 18844**, Dietmar Wueller, Image Engineering GmbH & Co. KG (Germany)

11:30

DPMI-006

**MTF measurements of wide field of view cameras**, Vlad Cardei, Boyd Fowler, Sam Kavusi, and Jonathan Phillips, Google Inc. (USA)

11:50

DPMI-007

**Method for quantifying image sensor susceptibility to chromatic flare artifacts**, Orit Skorka, Dave Jasinski, Radu Ispasoiu, and Vlad Kaborov, ON Semiconductor (USA)

12:10

DPMI-008

**Which factor is more important in obtaining good capture characterization, and, consequently, render higher color accuracy: The characterization of the camera's sensor, or the characterization of illuminant?**, Nitin Sampat and Stephen Viggiano, Rochester Institute of Technology (USA)

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)

3:00 – 3:30 pm Coffee Break

## Digital Photography and Mobile Imaging XII

**DPMI/IQSP: Image Capture I** Joint Session

Session Chairs: Susan Farnand, Rochester Institute of Technology (USA) and Dietmar Wueller, Image Engineering GmbH & Co. KG (Germany)

**3:30 – 5:00 pm**

Golden Gate 6/7

This session is jointly sponsored by: Digital Photography and Mobile Imaging XII and Image Quality and System Performance XIII.

3:30 IQSP-009

**Adaptive geometric calibration correction for camera array**, Florian Ciurea, Dan Lelescu, and Priyam Chatterjee, Pelican Imaging (USA)

4:00 IQSP-010

**A filter design approach for consistent image quality**, Ahmed Eid, Michael Phelps, and Brian Cooper, Lexmark International (USA)

4:20 IQSP-011

**Linearization and normalization in spatial frequency response measurement**, Uwe Artmann, Image Engineering GmbH & Co. KG (Germany)

4:40 IQSP-012

**Optimized tone curve for in-camera image processing**, Praveen Cyriac, David Kane, and Marcelo Bertalmio, Universitat Pompeu Fabra (Spain)

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

## Tuesday, February 16, 2016

**DPMI/IPAS: Image Filtering and Denoising** Joint Session

Session Chairs: Karen Egiazarian, Tampere University of Technology (Finland) and Zhen He, Intel Corporation (USA)

**8:50 – 10:10 am**

Golden Gate 6/7

This session is jointly sponsored by: Digital Photography and Mobile Imaging XII and Image Processing: Algorithms and Systems XIV.

8:50 IPAS-013

**Intelligent image filtering using multilayer neural network with multi-valued neurons**, Igor Aizenberg, Texas A&M University-Texarkana (USA)

9:10 IPAS-014

**Robust extensions to guided image filtering**, Oleg Michailovich, University of Waterloo (Canada)

9:30 DPMI-015

**Local denoising applied to RAW images may outperform non-local patch-based methods applied to the camera output**, Gabriela Ghimpeanu<sup>1</sup>, Thomas Batard<sup>1</sup>, Tamara Seybold<sup>2</sup>, and Marcelo Bertalmio<sup>1</sup>; <sup>1</sup>University Pompeu Fabra (Spain) and <sup>2</sup>ARRI Arnold & Richter Cine Technik GmbH & Co. Betriebs KG (Germany)

9:50 DPMI-016

**Use of flawed and ideal image pairs to drive filter creation by genetic programming**, Subash Sridhar, Henry Dietz, and Paul Eberhart, University of Kentucky (USA)

10:10 – 10:50 am Coffee Break

**DPMI/IPAS: Color Filter Array Interpolation and Superresolution** Joint Session

Session Chairs: Ajit Bopardikar, Samsung R&D Institute India - Bangalore (India) and Atanas Gotchev, Tampere University of Technology (Finland)

**10:50 am – 12:30 pm**

Golden Gate 6/7

This session is jointly sponsored by: Digital Photography and Mobile Imaging XII and Image Processing: Algorithms and Systems XIV.

10:50 IPAS-024

**Optimal transparent wavelength and arrangement for multispectral filter array**, Yudai Yanagi<sup>1</sup>, Kazuma Shinoda<sup>1</sup>, Madoka Hasegawa<sup>1</sup>, Shigeo Kato<sup>1</sup>, Masahiro Ishikawa<sup>2</sup>, Hideki Komagata<sup>2</sup>, and Naoki Kobayashi<sup>2</sup>; <sup>1</sup>Utsunomiya University and <sup>2</sup>Saitama Medical University (Japan)

11:10 DPMI-025

**Multi-spectrum to RGB with direct structure-tensor reconstruction**, Takashi Shibata<sup>1,2</sup>, Masayuki Tanaka<sup>1</sup>, and Masatoshi Okutomi<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology and <sup>2</sup>NEC Corporation (Japan)

11:30 IPAS-026

**Edge-directional interpolation algorithm using structure tensor**, Andrey Nasonov<sup>1</sup>, Andrey Krylov<sup>1</sup>, Xenya Petrova<sup>2</sup>, and Michael Rychagov<sup>2</sup>; <sup>1</sup>Lomonosov Moscow State University and <sup>2</sup>Samsung R&D Institute Rus (Russian Federation)

11:50 IPAS-027

**Fast edge-directed single-image super-resolution**, Mushfiqur Rouf<sup>1</sup>, Dikpal Reddy<sup>2</sup>, Kari Pulli<sup>2</sup>, and Rabab Ward<sup>3</sup>; <sup>1</sup>University of British Columbia (Canada) and <sup>2</sup>Light Co (USA)

12:10 DPMI-028

**Light-weight single image super-resolution via pattern-wise regression function**, Kohei Kurihara<sup>1</sup>, Yoshitaka Toyoda<sup>1</sup>, Shotaro Moriya<sup>2</sup>, Daisuke Suzuki<sup>1</sup>, Takeo Fujita<sup>1</sup>, Narihiro Matoba<sup>1</sup>, Jay Thornton<sup>3</sup>, and Fatih Porikli<sup>4</sup>; <sup>1</sup>Mitsubishi Electric Corporation, Advanced Technology R&D Center, (Japan), <sup>2</sup>Mitsubishi Electric Corporation, Kamakura Factory (Japan), <sup>3</sup>Mitsubishi Electric Research Laboratories (MERL) (USA), and <sup>4</sup>Australian National University (Australia)

12:30 – 2:00 pm Lunch Break

### EI 2016 Tuesday Plenary and Symposium Awards

Session Chair: Nitiin 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

## Digital Photography and Mobile Imaging XII

### High Dynamic Range Imaging

Session Chair: Thomas Vogelsang, Rambus Inc. (USA)

**3:30 – 4:30 pm**

Golden Gate 6/7

3:30 DPMI-245  
**High quality video in high dynamic range scenes from interlaced dual-ISO footage**, Raquel Gil Rodríguez and Marcelo Bertalmio, Universitat Pompeu Fabra (Spain)

3:50 DPMI-246  
**FPGA-based implementation of estimating saturated pixel values in RAW image**, Jun Fu, Yungang Wu, Xuanqin Mou, Wenbo Ji, and Ping Wang, Xi'an Jiaotong University (China)

4:10 DPMI-247  
**Novel approach to detect HDR scenes and determine suitable frames for image fusion**, Sphurti Bhoskar, Nanyang Technological University (Singapore) and Ramakrishna Kakarala, Picartio, Inc. (USA)

### Image Signal Processing Pipeline

Session Chair: Jon McElvain, Dolby Laboratories (USA)

**4:30 – 5:10 pm**

Golden Gate 6/7

4:30 DPMI-248  
**Local linear approximation for camera image processing pipelines**, Haomiao Jiang, Qiyuan Tian, Joyce Farrell, and Brian Wandell, Stanford University (USA)

4:50 DPMI-249  
**A novel adaptive shading correction algorithm for camera systems**, Varuna De Silva, Viacheslav Chesnokov, and Daniel Larkin, Apical Ltd (United Kingdom)

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

## Wednesday, February 17, 2016

### DPMI XII Keynote

Session Chair: Francisco Imai, Canon U.S.A. Inc. (USA)

**9:30 – 10:10 am**

Golden Gate 6/7

DPMI-250  
**Photo editing on mobile devices**, Sylvain Paris, Adobe (USA)

10:10 – 10:50 am Coffee Break

### DPMI/IPAS/VIPC: Blur Removal and Synthesis Joint Session

Session Chair: Radka Tezaur, Nikon Research Corp. of America (USA)

**10:50 am – 12:10 pm**

Golden Gate 6/7

This session is jointly sponsored by: Digital Photography and Mobile Imaging XII, Image Processing: Algorithms and Systems XIV, and Visual Information Processing and Communication VII.

10:50 DPMI-030  
**Multi-image sparse motion-invariant photography**, Bart Kofoed<sup>1,2</sup>, Peter de With<sup>1</sup>, and Eric Janssen<sup>2</sup>; <sup>1</sup>Eindhoven University of Technology and <sup>2</sup>Prodrive Technologies (Netherlands)

11:10 DPMI-031  
**Virtual DSLR: High quality dynamic depth-of-field synthesis on mobile platforms**, Yang Yang<sup>1</sup>, Haiting Lin<sup>1</sup>, Zhan Yu<sup>2</sup>, Sylvain Paris<sup>2</sup>, and Jingyi Yu<sup>1</sup>; <sup>1</sup>University of Delaware and <sup>2</sup>Adobe (USA)

11:50 VIPC-033  
**Motion deblurring for depth-varying scenes**, Ruiwen Zhen and Robert Stevenson, University of Notre Dame (USA)

12:10 – 2:00 pm Lunch Break

### EI 2016 Wednesday Plenary and Symposium Awards

Session Chair: Choon-Woo Kim (Inha University)

**2:00 – 3:00 PM**

Continental Ballroom 5

**Intel® RealSense Technology: Adding human-like sensing and interactions to computing devices**, Achin Bhowmik, Intel Corporation (USA)

3:00 – 3:30 pm Coffee Break

### Optics and Optical Modeling

Session Chair: Michael Kriss, MAK Consultants (USA)

**3:30 – 4:10 pm**

Golden Gate 6/7

3:30 DPMI-251  
**Gapless dual-layered diffractive optical element and optical design of imaging lens that incorporates it**, Hiroto Yasui, Canon Inc. (Japan)

3:50 DPMI-252  
**A three parameter underwater image formation model**, Henryk Blasinski and Joyce Farrell, Stanford University (USA)

## Digital Photography and Mobile Imaging XII

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### Digital Photography and Mobile Imaging XII Interactive Papers Oral Previews

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Session Chair: Kevin Matherson, Microsoft Corporation (USA)

#### 4:10 – 4:50 pm

Golden Gate 6/7

In this session interactive poster authors will each provide a brief oral preview of their poster presentation, which will be presented fully in the Digital Photography and Mobile Imaging XII Interactive Papers Session at 5:30 pm on Wednesday.

4:10

DPMI-253

**Focus assist for 4K camera**, Seiichi Gohshi, Kogakuin University (Japan)

4:15

DPMI-254

**Using disparity information for stereo autofocus in 3-D photography**, Shao-Kang Huang, Cheng-Chieh Yang, Kuang-Tsu Shih, and Homer H. Chen, National Taiwan University (Taiwan)

4:20

DPMI-255

**Fast JPEG rate control**, Sergey Zavalishin, Valery Anisimovskiy, and Ilya Kurilin, Samsung R&D Institute Russia (Russian Federation)

4:25

DPMI-256

**Single-sensor RGB and NIR image acquisition: Toward optimal performance by taking account of CFA pattern, demosaicking, and color correction**, Hayato Teranaka, Yusuke Monno, Masayuki Tanaka, and Masatoshi Okutomi, Tokyo Institute of Technology (Japan)

4:30

DPMI-257

**A reduced-reference image quality assessment model based on joint-distribution of neighboring LOG signals**, Congmin Chen and Xuanqin Mou, Institute of Image Processing & Pattern Recognition (China)

4:35

DPMI-258

**Several parameters that affect the spatial frequency response of camera phones to the dead leaves target**, Nitin Suresh<sup>1,2</sup> and Quanzeng Wang<sup>1</sup>; <sup>1</sup>US FDA and <sup>2</sup>University of Maryland (USA)

4:40

DPMI-259

**Scene appearance change as framerate approaches infinity**, Henry Dietz, Zachary Snyder, John Fike, and Pablo Quevedo, University of Kentucky (USA)

4:45

**DPMI Conference Closing Remarks**

### EI 2016 Symposium Interactive Papers Session

5:30 – 7:00 PM

Continental Ballroom 6

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### Digital Photography and Mobile Imaging XII Interactive Papers Session

5:30 – 7:00 pm

Continental Ballroom 6

The DPMI interactive papers will be presented in the EI 2016 Symposium Interactive Papers Session.