

# Image Quality and System Performance X

Peter D. Burns Sophie Triantaphillidou Editors

5–7 February 2013 Burlingame, California, United States

Sponsored by IS&T—The Society for Imaging Science and Technology SPIE

Cosponsored by Qualcomm Inc. (United States)

Published by SPIE

Volume 8653

Proceedings of SPIE 0277-786X, V.8653

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publishers are not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Image Quality and System Performance X*, edited by Peter D. Burns, Sophie Triantaphillidou, Proceedings of SPIE-IS&T Electronic Imaging, SPIE Vol. 8653. Article CID Number (2013)

ISSN: 0277-786X ISBN: 9780819494269

Copublished by

SPIF

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org
and

### IS&T—The Society for Imaging Science and Technology

7003 Kilworth Lane, Springfield, Virginia, 22151 USA Telephone +1 703 642 9090 (Eastern Time) · Fax +1 703 642 9094 imaging.org

Copyright © 2013, Society of Photo-Optical Instrumentation Engineers and The Society for Imaging Science and Technology.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by the publishers subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/13/\$18.00.

Printed in the United States of America.

**Paper Numbering:** Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID Number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID Number.

# **Contents**

vii	Conference Committee
SESSION 1	IMAGE QUALITY EVALUATION METHODS/STANDARDS FOR MOBILE AND DIGITAL PHOTOGRAPHY I: JOINT SESSION WITH CONFERENCES 8653, 8660, AND 8667C
8653 02	A no-reference quality assessment algorithm for JPEG2000-compressed images based on local sharpness [8653-1] P. V. Vu, D. M. Chandler, Oklahoma State Univ. (United States)
SESSION 2	IMAGE QUALITY EVALUATION METHODS/STANDARDS FOR MOBILE AND DIGITAL PHOTOGRAPHY II: JOINT SESSION WITH CONFERENCES 8653, 8660, AND 8667C
8653 03	Measurement and protocol for evaluating video and still stabilization systems [8653-2] E. Cormier, F. Cao, F. Guichard, C. Viard, DxO Labs (France)
SESSION 3	AIRBORNE AND SECURITY APPLICATIONS
8653 04	Hyperspectral image quality for unmixing and subpixel detection applications [8653-3] J. P. Kerekes, D. S. Goldberg, Rochester Institute of Technology (United States)
8653 05	Acceptable bit-rates for human face identification from CCTV imagery [8653-4] A. Tsifouti, Ctr. for Applied Science and Technology (United Kingdom) and Univ. of Westminster (United Kingdom); S. Triantaphillidou, E. Bilissi, Univ. of Westminster (United Kingdom); MC. Larabi, Univ. of Poitiers (France)
8653 06	Visual acuity and task-based video quality in public safety applications [8653-5] J. Dumke, Institute for Telecommunication Sciences (United States)
SESSION 4	3D AND VIDEO APPLICATIONS
8653 08	<b>Evaluation of biological effect on luminance of stereoscopic displays</b> [8653-7] K. Takahashi, T. Nakaguchi, R. Okamoto, I. Shimoyama, Y. Miyake, Chiba Univ. (Japan)
8653 09	Three factors that influence the overall quality of the stereoscopic 3D content: image quality, comfort, and realism [8653-8] R. Vlad, P. Ladret, A. Guérin, GIPSA-lab (France)
8653 0A	Performance evaluation of HD camcorders: measuring texture distortions using Gabor filters and spatio-velocity CSF [8653-9] K. Zhu, D. Saupe, Univ. of Konstanz (Germany)

SESSION 5	PERCEPTUAL IMAGE QUALITY
8653 OB	Evaluation of differences in quality of experience features for test stimuli of good-only and bad-only overall audiovisual quality [8653-10]  D. Strohmeier, Telekom Innovation Labs (Germany); K. Kunze, K. Göbel, J. Liebetrau, Ilmenau Univ. of Technology (Germany)
8653 OC	Contrast sensitivity and discrimination of complex scenes [8653-11] S. Triantaphillidou, J. Jarvis, G. Gupta, Univ. of Westminster (United Kingdom)
8653 0D	Grouping strategies to improve the correlation between subjective and objective image quality data [8653-12] S. Corchs, F. Gasparini, R. Schettini, Univ. degli Studi di Milano-Bicocca (Italy)
8653 OE	Adapting the ISO 20462 softcopy ruler method for online image quality studies [8653-13] P. D. Burns, Burns Digital Imaging (United States); J. B. Phillips, NVIDIA Corp. (United States); D. Williams, Imaging Science Associates (United States)
SESSION 6	SYSTEM ANALYSIS AND OBJECTIVE IMAGE QUALITY METRICS
8653 OF	A line-based HDR sensor simulator for motion artifact prediction [8653-14] D. Baxter, STMicroelectronics Ltd. (United Kingdom)
8653 OG	On the spectral quality of scanner illumination with LEDs [8653-15] C. Cui, Lexmark International Inc. (United States)
8653 OH	Refined measurement of digital image texture loss [8653-16] P. D. Burns, Burns Digital Imaging (United States)
8653 OI	F-MAD: a feature-based extension of the most apparent distortion algorithm for image quality assessment [8653-17] P. Singh, D. M. Chandler, Oklahoma State Univ. (United States)
8653 OJ	An algorithm for no-reference image quality assessment based on log-derivative statistics of natural scenes [8653-18] Y. Zhang, D. M. Chandler, Oklahoma State Univ. (United States)
SESSION 7	IMAGE QUALITY IN PRINT I
8653 OK	On the analysis of wavelet-based approaches for print grain artifacts [8653-19] A. H. Eid, B. E. Cooper, E. E. Rippetoe, Lexmark International Inc. (United States)
8653 OL	A general approach for assessment of print quality [8653-20] X. Jing, Purdue Univ. (United States); S. Astling, R. Jessome, E. Maggard, T. Nelson, M. Shaw, Hewlett-Packard Co. (United States); J. P. Allebach, Purdue Univ. (United States)

8653 OM	Verification of proposed ISO methods to measure resolution capabilities of printing systems [8653-21]
	M. Cisarova, Gjøvik Univ. College (Norway) and Univ. of Pardubice (Czech Republic); M. Pedersen, P. Nussbaum, Gjøvik Univ. College (Norway); F. Gaykema, Océ Technologies B.V. (Netherlands)
8653 ON	Assessment of presence of isolated periodic and aperiodic bands in laser electrophotographic printer output [8653-22]
	J. Zhang, Purdue Univ. (United States); S. Astling, R. Jessome, E. Maggard , T. Nelson, M. Shaw, Hewlett-Packard Co. (United States); J. P. Allebach, Purdue Univ. (United States)
SESSION 8	IMAGE QUALITY IN PRINT II
8653 00	Printing artificial sweat using ink jet printers for the test set generation in forensics: an image quality assessment of the reproducibility of the printing results [8653-23] M. Hildebrandt, J. Sturm, J. Dittmann, Otto-von-Guericke Univ. of Magdeburg (Germany)
8653 OP	Figure of merit for macrouniformity based on image quality ruler evaluation and machine learning framework [8653-25]
	W. Wang, Purdue Univ. (United States); G. Overall, T. Riggs, R. Silveston-Keith, J. Whitney, Lexmark International, Inc. (United States); G. Chiu, J. P. Allebach, Purdue Univ. (United States)
8653 OQ	Wavelet-based figure of merit for macro-uniformity [8653-26] X. Liu, Purdue Univ. (United States); G. Overall, T. Riggs, R. Silveston-Keith, J. Whitney, Lexmark International, Inc. (United States); G. Chiu, J. Allebach, Purdue Univ. (United States)
	INTERACTIVE PAPER SESSION
8653 OR	Generation of PDF with vector symbols from scanned document [8653-27] I. V. Kurilin, I. V. Safonov, M. N. Rychagov, Samsung Moscow Research Ctr. (Russian Federation); H. Lee, S. H. Kim, D. Choi, Samsung Electronics Co., Ltd. (Korea, Republic of)
8653 OS	Qualification process of CR system and quantification of digital image quality [8653-29] P. Garnier, L. Hun, J. Klein, C. Lemerle, CEA Valduc (France)
8653 OT	Minimum image quality assessment based on saliency maps: a human visual approach [8653-28]
	J. Barreira, M. Bessa, L. Magalhães, Univ. de Trás-os-Montes e Alto Douro (Portugal) and INESC TEC (Portugal)
	Author Index

# **Conference Committee**

Symposium Chair

Gaurav Sharma, University of Rochester (United States)

Symposium Cochair

Sergio R. Goma, Qualcomm Inc. (United States)

Conference Chairs

**Peter D. Burns**, Burns Digital Imaging (United States) **Sophie Triantaphillidou**, University of Westminster (United Kingdom)

Conference Program Committee

**Majed Chambah**, Université de Reims Champagne-Ardenne (France)

Luke C. Cui, Lexmark International, Inc. (United States)

Mark D. Fairchild, Rochester Institute of Technology (United States)

**Susan P. Farnand**, Rochester Institute of Technology (United States)

Robert D. Fiete, ITT Exelis (United States)

Frans Gaykema, Océ Technologies B.V. (Netherlands)

**Dirk W. Hertel**, E Ink Corporation (United States)

Robin B. Jenkin, Apple, Inc. (United States)

Sang Ho Kim, Samsung Digital City (Korea, Republic of)

Chaker Larabi, Université de Poitiers (France)

Lindsay William MacDonald, MacColour, Ltd. (United Kingdom)

Toshiya Nakaguchi, Chiba University (Japan)

Göte S. Nyman, University of Helsinki (Finland)

**Stuart W. Perry**, Canon Australia Pty. Ltd. (Australia)

D. René Rasmussen, Qi Analytics LLC (United States)

Eric K. Zeise, Kodak's Graphic Communications Group (United States)

## Session Chairs

Image Quality Evaluation Methods/Standards for Mobile and Digital Photography I: Joint Session with Conferences 8653, 8660, and 8667C Sebastiano Battiato, Università degli Studi di Catania (Italy) Peter D. Burns, Burns Digital Imaging (United States)

- 2 Image Quality Evaluation Methods/Standards for Mobile and Digital Photography II: Joint Session with Conferences 8653, 8660, and 8667C Dietmar Wüller, Image Engineering GmbH & Co. KG (Germany) Nitin Sampat, Rochester Institute of Technology (United States)
- 3 Airborne and Security Applications Robert D. Fiete, ITT Exelis (United States)
- 4 3D and Video Applications **Chaker Larabi**, Université de Poitiers (France)
- Perceptual Image Quality
   Susan P. Farnand, Rochester Institute of Technology (United States)
- 6 System Analysis and Objective Image Quality Metrics Sophie Triantaphillidou, University of Westminster (United Kingdom)
- 7 Image Quality In Print ISang Ho Kim, Samsung Digital City (Korea, Republic of)
- 8 Image Quality in Print II Frans Gaykema, Océ Technologies B.V. (Netherlands)