PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 7865

, "Front Matter: Volume 7865," Proc. SPIE 7865, Human Vision and Electronic Imaging XVI, 786501 (24 March 2011); doi: 10.1117/12.888807

SPIE.

Event: IS&T/SPIE Electronic Imaging, 2011, San Francisco Airport, California, United States

Human Vision and Electronic Imaging XVI

**Bernice E. Rogowitz
Thrasyvoulos N. Pappas**
Editors

**24–27 January 2011
San Francisco, California, United States**

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

Cosponsored by
iPlant Collaborative (United States)

Volume 7865

Proceedings of SPIE, 0277-786X, v. 7865

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

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 publisher is 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 *Human Vision and Electronic Imaging XVI*, edited by Bernice E. Rogowitz, Thrasyvoulos N. Pappas, SPIE-IS&T Electronic Imaging, Vol. 7865 (SPIE, Bellingham, WA, 2011) Article CID Number.

ISSN 0277-786X

ISBN 9780819484024

Copublished by

SPIE

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 © 2011, 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 SPIE 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/11/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

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 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*

KEYNOTE SESSION

- 7865 03 **How 3D immersive visualization is changing medical diagnostics (Keynote Paper)** [7865-02]
A. H. J. Koning, Erasmus MC (Netherlands)
- 7865 04 **Vision as a user interface (Keynote Paper)** [7865-03]
J. Koenderink, Delft Univ. of Technology (Netherlands) and Katholieke Univ. Leuven (Belgium)

DESIGN, COMPOSITION, AND ILLUMINATION

- 7865 05 **What makes good image composition?** [7865-05]
R. Banner, Hewlett-Packard Labs. Israel Ltd. (Israel)
- 7865 06 **A comparison of perceived lighting characteristics in simulations versus real-life setup** [7865-06]
B. Salters, P. Seuntjens, Philips Research Nederland B.V. (Netherlands)
- 7865 07 **Investigating two features of aesthetic perception in consumer photographic images: clutter and center** [7865-07]
C. D. Cerosaletti, A. C. Loui, A. C. Gallagher, Eastman Kodak Co. (United States)

EXTRACTING, INTEGRATING, AND ANALYZING FEATURES

- 7865 08 **Analyzing near-infrared images for utility assessment** [7865-08]
N. Salamati, Z. Sadeghipoor, S. Süsstrunk, École Polytechnique Fédérale de Lausanne (Switzerland)
- 7865 09 **Appearance-based human gesture recognition using multimodal features for human computer interaction** [7865-09]
D. Luo, Waseda Univ. (Japan) and Karlsruher Institute of Technology (Germany); H. Gao, H. K. Ekenel, Karlsruher Institute of Technology (Germany); J. Ohya, Waseda Univ. (Japan)
- 7865 0A **Adaptive user interfaces for relating high-level concepts to low-level photographic parameters** [7865-10]
E. Scott, P. Madhawa Silva, B. Pardo, T. N. Pappas, Northwestern Univ. (United States)
- 7865 0B **Parametric quality assessment of synthesized textures** [7865-11]
D. Siddalinga Swamy, K. J. Butler, D. M. Chandler, Oklahoma State Univ. (United States); S. S. Hemami, Cornell Univ. (United States)
- 7865 0C **On the perception of band-limited phase distortion in natural scenes** [7865-12]
K. P. Vilankar, L. Vasu, D. M. Chandler, Oklahoma State Univ. (United States)

PERCEPTUAL AND COGNITIVE CHALLENGES IN THE VISUALIZATION AND VISUAL ANALYSIS OF BIOINFORMATICS DATA

- 7865 OD **Applying information visualization principles to biological network displays** [7865-13]
T. Munzner, Univ. of British Columbia (Canada)
- 7865 OE **Hypergraph visualization and enrichment statistics: how the EGAN paradigm facilitates organic discovery from big data** [7865-47]
J. Paquette, T. Tokuyasu, Univ. of California, San Francisco (United States)
- 7865 OF **Perceptual issues in the recovery and visualisation of integrated systems biology data** [7865-15]
T. Pridmore, The Univ. of Nottingham (United Kingdom)
- 7865 OG **Using cellular network diagrams to interpret large-scale datasets: past progress and future challenges** [7865-16]
P. D. Karp, M. Latendresse, S. Paley, SRI International (United States)
- 7865 OH **Visualizing large high-throughput datasets based on the cognitive representation of biological pathways** [7865-17]
A. Nagel, M. Lohse, A. Bolger, M. Stitt, B. Usadel, Max-Planck-Institut für Molekulare Pflanzenphysiologie (Germany)
- 7865 OI **Metadata Mapper: a web service for mapping data between independent visual analysis components, guided by perceptual rules** [7865-18]
B. E. Rogowitz, The Univ. of Texas at Austin (United States); N. Matasci, Univ. of Arizona (United States)

EVALUATING THE QUALITY OF THE STEREOSCOPIC EXPERIENCE II: JOINT SESSION WITH CONFERENCE 7863

- 7865 OJ **Examination of 3D visual attention in stereoscopic video content** [7865-20]
Q. Huynh-Thu, L. Schiatti, Technicolor (France)
- 7865 OK **Quantifying how the combination of blur and disparity affects the perceived depth** [7865-21]
J. Wang, M. Barkowsky, V. Ricordel, P. Le Callet, IRCCyN, CNRS, Univ. de Nantes (France)

PERCEPTUAL APPROACHES TO VIDEO QUALITY

- 7865 OL **Preferences for the balance between true image detail and noise** [7865-22]
S. Deshpande, S. Daly, Sharp Labs. of America, Inc. (United States)
- 7865 OM **Measurement of compression-induced temporal artifacts in subjective and objective video quality assessment** [7865-23]
C. Mantel, Gipsa-lab, Grenoble Institute of Technology, CNRS (France) and STMicroelectronics S.A. (France); P. Ladret, Gipsa-lab, Grenoble Institute of Technology, CNRS (France); T. Kunlin, STMicroelectronics S.A. (France)
- 7865 ON **Perceived contrast of electronically magnified video** [7865-24]
A. M. Haun, R. L. Woods, E. Peli, Schepens Eye Research Institute, Harvard Medical School (United States)

- 7865 0O **Estimating the impact of single and multiple freezes on video quality** [7865-25]
S. van Kester, Univ. of Technology Delft (Netherlands); T. Xiao, Acreo AB (Sweden); R. E. Kooij, Univ. of Technology Delft (Netherlands) and TNO (Netherlands); K. Brunnström, Acreo AB (Sweden); O. K. Ahmed, TNO (Netherlands)
- 7865 0P **The effects of scene characteristics, resolution, and compression on the ability to recognize objects in video** [7865-26]
J. Dumke, C. G. Ford, I. W. Stange, U.S. Dept. of Commerce (United States)
- 7865 0Q **Supplemental subjective testing to evaluate the performance of image and video quality estimators** [7865-27]
F. M. Ciaramello, Cornell Univ. (United States); A. R. Reibman, AT&T Labs. Research (United States)
- 7865 0R **On evaluation of video quality metrics: an HDR dataset for computer graphics applications** [7865-28]
M. Čadík, T. O. Aydin, K. Myszkowski, H.-P. Seidel, Max-Planck-Institut für Informatik (Germany)

VISUAL ATTENTION, SALIENCY, AND QUALITY I: JOINT SESSION WITH CONFERENCE 7867

- 7865 0S **Interactions of visual attention and quality perception** [7865-29]
J. Redi, H. Liu, Technische Univ. Delft (Netherlands); R. Zunino, Univ. degli Studi di Genova (Italy); I. Heynderickx, Technische Univ. Delft (Netherlands) and Philips Research Nederland B.V. (Netherlands)
- 7865 0T **Task dependence of visual attention on compressed videos: point of gaze statistics and analysis** [7865-30]
A. Mittal, A. K. Moorthy, W. S. Geisler, A. C. Bovik, The Univ. of Texas at Austin (United States)
- 7865 0U **Measuring contour degradation in natural image utility assessment: methods and analysis** [7865-31]
G. O. Pinto, D. M. Rouse, S. S. Hemami, Cornell Univ. (United States)

VISUAL ATTENTION, SALIENCY, AND QUALITY II: JOINT SESSION WITH CONFERENCE 7867

- 7865 0V **Evolution of attention mechanisms for early visual processing** [7865-32]
T. Müller, A. Knoll, Technische Univ. München (Germany)
- 7865 0W **Learned saliency transformations for gaze guidance** [7865-33]
E. Vig, Univ. of Lübeck (Germany); M. Dorr, Univ. of Lübeck (Germany) and Harvard Medical School (United States); E. Barth, Univ. of Lübeck (Germany)

ATTENTION AND GAZE IN CONSTRUCTING THE VISUAL WORLD

- 7865 0X **Relationship between selective visual attention and visual consciousness (Keynote Paper)** [7865-34]
N. Tsuchiya, Japan Science and Technology Agency (Japan), RIKEN Brain Science Institute (Japan), and California Institute of Technology (United States); C. Koch, California Institute of Technology (United States)

- 7865 0Y **A gaze-contingent display to study contrast sensitivity under natural viewing conditions** [7865-35]
M. Dorr, P. J. Bex, Schepens Eye Research Institute, Harvard Medical School (United States)
- 7865 0Z **Analyzing complex gaze behavior in the natural world** [7865-36]
J. B. Pelz, T. B. Kinsman, K. M. Evans, Rochester Institute of Technology (United States)
- 7865 10 **What your visual system sees where you are not looking** [7865-37]
R. Rosenholtz, Massachusetts Institute of Technology (United States)
- 7865 11 **Attention as a Bayesian inference process** [7865-38]
S. Chikkerur, Massachusetts Institute of Technology (United States); T. Serre, Massachusetts Institute of Technology (United States) and Brown Univ. (United States); C. Tan, T. Poggio, Massachusetts Institute of Technology (United States)

INTERACTIVE PAPER SESSION

- 7865 13 **Depth perception enhancement based on chromostereopsis** [7865-40]
J. Y. Hong, H. Y. Lee, D. S. Park, C. Y. Kim, Samsung Advanced Institute of Technology (Korea, Republic of)
- 7865 14 **An evaluation of perceived color break-up on field-sequential color displays** [7865-41]
M. Kobayashi, A. Yoshida, Y. Yoshida, Sharp Corp. (Japan)
- 7865 15 **Text detection: effect of size and eccentricity** [7865-42]
C.-H. Kao, C.-C. Chen, National Taiwan Univ. (Taiwan)
- 7865 16 **Image enhancement of high digital magnification for patients with central vision loss** [7865-43]
Z. Li, G. Luo, E. Peli, Schepens Eye Research Institute, Harvard Medical School (United States)
- 7865 17 **Quality versus intelligibility: studying human preferences for American Sign Language video** [7865-44]
F. M. Ciaramello, S. S. Hemami, Cornell Univ. (United States)
- 7865 18 **Metaphor progress report: image recall and blending** [7865-45]
H. K. Rising III, Consultant (United States)
- 7865 19 **Space perception in pictures** [7865-46]
A. J. van Doorn, Technische Univ. Delft (Netherlands); J. Wagemans, Katholieke Univ. Leuven (Belgium); H. de Ridder, Technische Univ. Delft (Netherlands); J. J. Koenderink, Katholieke Univ. Leuven (Belgium) and Technische Univ. Delft (Netherlands)

Author Index

Conference Committee

Symposium Chair

Sabine Süsstrunk, École Polytechnique Fédérale de Lausanne
(Switzerland)

Symposium Cochair

Majid Rabbani, Eastman Kodak Company (United States)

Conference Chairs

Bernice E. Rogowitz, Visual Perspectives Consulting (United States) and
The University of Texas at Austin (United States)
Thrasyvoulos N. Pappas, Northwestern University (United States)

Program Committee

Albert J. Ahumada, Jr., NASA Ames Research Center (United States)
Jan P. Allebach, Purdue University (United States)
Erhardt Barth, Universität zu Lübeck (Germany)
Walter R. Bender, MIT Media Laboratory (United States)
Michael H. Brill, Datacolor (United States)
John C. Dalton, Synthetik Software (United States)
Scott J. Daly, Dolby Laboratories, Inc. (United States)
Huib de Ridder, Technische Universiteit Delft (Netherlands)
Elena A. Fedorovskaya, Eastman Kodak Company (United States)
Jennifer Gille, Qualcomm Inc. (United States)
Sheila S. Hemami, Cornell University (United States)
Laurent Itti, The University of Southern California (United States)
Stanley A. Klein, University of California, Berkeley (United States)
Patrick Le Callet, Université de Nantes (France)
John J. McCann, McCann Imaging (United States)
Jeffrey B. Mulligan, NASA Ames Research Center (United States)
Karol Myszkowski, Max-Planck-Institut für Informatik (Germany)
Adar Pelah, The University of York (United Kingdom)
Eliezer Peli, Schepens Eye Research Institute (United States)
Sylvia C. Pont, Technische Universiteit Delft (Netherlands)
Hawley K. Rising III, Consultant (United States)
Sabine E. Süsstrunk, Ecole Polytechnique Fédérale de Lausanne
(Switzerland)

Christopher W. Tyler, The Smith-Kettlewell Eye Research Institute (United States)

Andrew B. Watson, NASA Ames Research Center (United States)

Session Chairs

- 1 Keynote Session
Bernice E. Rogowitz, Visual Perspectives Consulting (United States) and The University of Texas at Austin (United States)
Thrasyvoulos N. Pappas, Northwestern University (United States)
- 2 Design, Composition, and Illumination
Thrasyvoulos N. Pappas, Northwestern University (United States)
- 3 Extracting, Integrating, and Analyzing Features
Bernice E. Rogowitz, Visual Perspectives Consulting (United States) and The University of Texas at Austin (United States)
- 4 Perceptual and Cognitive Challenges in the Visualization and Visual Analysis of Bioinformatics Data
Bernice E. Rogowitz, Visual Perspectives Consulting (United States) and The University of Texas at Austin (United States)
- 5 Evaluating the Quality of the Stereoscopic Experience I: Joint Session with Conference 7863
Eliezer Peli, Schepens Eye Research Institute (United States)
Christopher W. Tyler, The Smith-Kettlewell Eye Research Institute (United States)
Andrew J. Woods, Curtin University (Australia)
- 6 Evaluating the Quality of the Stereoscopic Experience II: Joint Session with Conference 7863
Eliezer Peli, Schepens Eye Research Institute (United States)
Christopher W. Tyler, The Smith-Kettlewell Eye Research Institute (United States)
Andrew J. Woods, Curtin University (Australia)
- 7 Perceptual Approaches to Video Quality
Thrasyvoulos N. Pappas, Northwestern University (United States)
- 8 Visual Attention, Saliency, and Quality I: Joint Session with Conference 7867
Susan P. Farnand, Rochester Institute of Technology (United States)
Bernice E. Rogowitz, Visual Perspectives Consulting (United States) and The University of Texas at Austin (United States)
Thrasyvoulos N. Pappas, Northwestern University (United States)

- 9 Visual Attention, Saliency, and Quality II: Joint Session with Conference
7867
Susan P. Farnand, Rochester Institute of Technology (United States)
Bernice E. Rogowitz, Visual Perspectives Consulting (United States) and
The University of Texas at Austin (United States)
- 10 Attention and Gaze in Constructing the Visual World
Elena A. Fedorovskaya, Eastman Kodak Company (United States)