PROCEEDINGS
IS&T/SPIE
Electronic
Imaging
Science and Technology

Visual Information Processing and Communication III

Amir Said
Onur G. Guleryuz
Robert L. Stevenson
Editors

24–26 January 2012
Burlingame, California, United States

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

Volume 8305

Proceedings of SPIE, 0277-786X, v. 8305

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 *Visual Information Processing and Communication III*, edited by Amir Said, Onur G. Guleryuz, Robert L. Stevenson, Proceedings of SPIE-IS&T Electronic Imaging, SPIE Vol. 8305, Article CID Number (2012).

ISSN 0277-786X
ISBN 9780819489524

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 © 2012, 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/12/$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

Conference Committee

Symposium Chairs

Majid Rabbani, Eastman Kodak Company (United States)
Gaurav Sharma, University of Rochester (United States)

Conference Chairs

Amir Said, Hewlett-Packard Laboratories (United States)
Onur G. Guleryuz, FutureWei Technologies, Inc. (United States)
Robert L. Stevenson, University of Notre Dame (United States)

Program Committee

John G. Apostolopoulos, Hewlett-Packard Laboratories (United States)
Vasudev Bhaskaran, Qualcomm Inc. (United States)
Mireille Boutin, Purdue University (United States)
Chang Wen Chen, University at Buffalo (United States)
Gerard de Haan, Philips Research Nederland B.V. (Netherlands)
Edward J. Delp III, Purdue University (United States)
Eric Dubois, University of Ottawa (Canada)
Frederic Dufaux, Telecom ParisTech (France)
Touradj Ebrahimi, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
Keigo Hirakawa, University of Dayton (United States)
Marta Karczewicz, Qualcomm Inc. (United States)
Janusz Konrad, Boston University (United States)
C.-C. Jay Kuo, The University of Southern California (United States)
Robert P. Loce, Xerox Corporation (United States)
Ligang Lu, IBM Thomas J. Watson Research Center (United States)
Peyman Milanfar, University of California, Santa Cruz (United States)
Antonio Ortega, The University of Southern California (United States)
Thrasyvoulos N. Pappas, Northwestern University (United States)
William A. Pearlman, Rensselaer Polytechnic Institute (United States)
Fernando Pereira, Universidade Técnica de Lisboa (Portugal)
Béatrice Pesquet-Popescu, Telecom ParisTech (France)
Majid Rabbani, Eastman Kodak Company (United States)
Eli Saber, Rochester Institute of Technology (United States)
Dan Schonfeld, University of Illinois at Chicago (United States)
Gaurav Sharma, University of Rochester (United States)
Andrew G. Tescher, AGT Associates (United States)
Anthony Vetro, Mitsubishi Electric Research Laboratories (United States)
John W. Woods, Rensselaer Polytechnic Institute (United States)
Xiaolin Wu, McMaster University (Canada)

Session Chairs

Keynote Presentation I
Onur G. Guleryuz, FutureWei Technologies, Inc. (United States)

Session 1
Gregory W. Cook, FutureWei Technologies Company, Ltd. (United States)

Session 2
William A. Pearlman, Rensselaer Polytechnic Institute (United States)

Session 3
Wai-Tian Tan, Hewlett-Packard Laboratories (United States)

Keynote Presentation II
Amir Said, Hewlett-Packard Laboratories (United States)

Session 4
Robert L. Stevenson, University of Notre Dame (United States)

Session 5
Gregory W. Cook, FutureWei Technologies, Inc. (United States)

Session 6
Soren Forchhammer, Technical University of Denmark (Denmark)

Keynote Presentation III
Amir Said, Hewlett-Packard Laboratories (United States)

Session 7
Lisimachos P. Kondi, University of Ioannina (Greece)

Session 8
Robert P. Loce, Xerox Corporation (United States)

Session 9
Robert P. Loce, Xerox Corporation (United States)