

PROCEEDINGS OF SPIE

Optics and Photonics for Information Processing IV

Abdul Ahad Sami Awwal

Khan M. Iftekharuddin

Scott C. Burkhart

Editors

4–5 August 2010

San Diego, California, United States

Sponsored and Published by
SPIE

Volume 7797

Proceedings of SPIE, 0277-786X, v. 7797

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 *Optics and Photonics for Information Processing IV*, edited by Abdul Ahad Sami Awwal, Khan M. Iftekharuddin, Scott C. Burkhart, Proceedings of SPIE Vol. 7797 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X
ISBN 9780819482938

Published 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

Copyright © 2010, Society of Photo-Optical Instrumentation Engineers

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/10/\$18.00.

Printed in the United States of America.

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



SPIEDigitalLibrary.org

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

ix Conference Committee

SESSION 1 OPTICAL INTERCONNECTS/NETWORK

7797 02 **Ultra-low power silicon photonic transceivers for inter/intra-chip interconnects (Invited Paper) [7797-01]**

X. Zheng, J. E. Cunningham, G. Li, Y. Luo, H. Thacker, J. Yao, R. Ho, J. Lexau, F. Liu, D. Patil, P. Amberg, N. Pinckney, Sun Labs., Oracle (United States); P. Dong, D. Feng, M. Asghari, Kotura, Inc. (United States); A. Mekis, T. Pinguet, Luxtera (United States); K. Raj, A. V. Krishnamoorthy, Sun Labs., Oracle (United States)

7797 03 **Optical switching with two symmetrically coupled SOAs [7797-02]**

P. A. Costanzo-Caso, Rose-Hulman Institute of Technology (United States), Ctr. de Investigaciones Ópticas (Argentina), and Univ. Nacional de La Plata (Argentina); M. Gehl, S. Granieri, A. Siahmakoun, Rose-Hulman Institute of Technology (United States)

7797 04 **Dispersion and nonlinear effects in OFDM-RoF system [7797-03]**

B. H. Alhasson, A. M. Bloul, M. Matin, Univ. of Denver (United States)

7797 05 **Amphibious assault ship local area network [7797-04]**

J. S. Goff, T. P. Million, Northrop Grumman Corp. (United States)

7797 06 **Consideration of dispersion and group velocity dispersion in the determination of velocities of electromagnetic propagation [7797-05]**

M. R. Chatterjee, P. P. Banerjee, Univ. of Dayton (United States)

SESSION 2 SIGNAL/IMAGE PROCESSING I

7797 09 **Optical deconvolution for multilayer reflected data [7797-08]**

A. D. McAulay, Lehigh Univ. (United States)

7797 0A **Redesign of the image processing techniques used for the alignment of the LMJ amplifier section [7797-09]**

L. Hilsz, Commissariat à l'Énergie Atomique et aux Énergies Alternatives (France); S. Challois, F. Nicaise, Alliance Vision (France); M. Luttmann, A. Adolf, Commissariat à l'Énergie Atomique et aux Énergies Alternatives (France)

SESSION 3 SIGNAL/IMAGE PROCESSING II

- 7797 0D **Redesign of the image processing techniques used for the alignment of the LMJ beams transportation section** [7797-12]
L. Hilsz, Commissariat à l'Énergie Atomique et aux Énergies Alternatives (France); J.-C. Benoit, Alliance Vision (France); F. Poutriquet, O. Bach, Commissariat à l'Énergie Atomique et aux Énergies Alternatives (France); F. Nicaise, Alliance Vision (France); A. Adolf, Commissariat à l'Énergie Atomique et aux Énergies Alternatives (France)
- 7797 0E **Image registration under affine transformation using cellular simultaneous recurrent networks** [7797-13]
K. M. Iftekharuddin, K. Anderson, The Univ. of Memphis (United States)
- 7797 0F **Optical time-domain mixer** [7797-14]
G. C. Valley, G. A. Sefler, The Aerospace Corp. (United States)
- 7797 0G **Detection of Hohlraum target position for laser fusion experiments** [7797-15]
A. A. S. Awwal, Lawrence Livermore National Lab. (United States)

SESSION 4 OPTICAL LOGIC/COMPUTING

- 7797 0H **GFSOP-based ternary quantum logic synthesis (Invited Paper)** [7797-16]
M. H. A. Khan, East West Univ. (Bangladesh)
- 7797 0I **Signal-to-noise ratio calculation with statistical method in collinear holographic memory** [7797-17]
T. Shimura, J. Tottori, R. Fujimura, K. Kuroda, The Univ. of Tokyo (Japan)
- 7797 0J **Photonic integrator for A/D conversion** [7797-18]
Y. Jin, Rose-Hulman Institute of Technology (United States); P. A. Costanzo-Caso, Rose-Hulman Institute of Technology (United States), Ctr. de Investigaciones Ópticas (Argentina), and Univ. Nacional de La Plata (Argentina); S. Granieri, A. Siahmakoun, Rose-Hulman Institute of Technology (United States)
- 7797 0L **Optical transistor action by nonlinear coupling of stimulated emission and coherent scattering** [7797-20]
D. L. Andrews, D. S. Bradshaw, Univ. of East Anglia Norwich (United Kingdom)

SESSION 5 OPTICAL IMAGING

- 7797 0M **The National Ignition Facility: alignment from construction to shot operations (Invited Paper)** [7797-21]
S. C. Burkhart, E. Bliss, P. Di Nicola, D. Kalantar, R. Lowe-Webb, T. McCarville, D. Nelson, T. Salmon, T. Schindler, J. Villanueva, K. Wilhelmsen, Lawrence Livermore National Lab. (United States)
- 7797 0N **High-speed multispectral three-dimensional imaging with a compound-eye camera TOMBO** [7797-22]
K. Kagawa, N. Fukata, J. Tanida, Osaka Univ. (Japan)

- 7797 0P **Final optics damage inspection (FODI) for the National Ignition Facility** [7797-24]
A. Conder, J. Chang, L. Kegelmeyer, M. Spaeth, P. Whitman, Lawrence Livermore National Lab. (United States)

SESSION 6 ELECTRO-OPTICAL DISPLAY

- 7797 0Q **Characterization of a parallel aligned liquid crystal on silicon and its application on a Shack-Hartmann sensor** [7797-26]
L. Lobato, Univ. Autònoma de Barcelona (Spain); A. Márquez, Univ. de Alicante (Spain); A. Lizana, Univ. Autònoma de Barcelona (Spain); I. Moreno, Univ. Miguel Hernández de Elche (Spain); C. Iemmi, Univ. de Buenos Aires (Argentina); J. Campos, Univ. Autònoma de Barcelona (Spain)
- 7797 0R **High-quality 3D fingerprint acquisition using a novel sub-window-based structured light illumination approach** [7797-27]
V. Yalla, R. Daley, C. Boles, Flashscan3D LLC (United States); L. Hassebrook, Univ. of Kentucky (United States); K. Fleming, M. Troy, Flashscan3D LLC (United States)

SESSION 7 3D-DISPLAY

- 7797 0U **Multi-view display system based on autostereoscopic display with directional sound** [7797-30]
Y. Kim, Y.-H. Kim, J. Kim, J. Hahn, Seoul National Univ. (Korea, Republic of); S.-W. Min, Kyung Hee Univ. (Korea, Republic of); B. Lee, Seoul National Univ. (Korea, Republic of)
- 7797 0V **Complete Stokes polarimeters based on liquid crystal displays** [7797-31]
A. Peinado, A. Lizana, Univ. Autònoma de Barcelona (Spain); J. Vidal, Univ. Autònoma de Barcelona (Spain) and ALBA-Synchrotron Light Facility (Spain); C. Iemmi, Univ. de Buenos Aires (Argentina); J. Campos, Univ. Autònoma de Barcelona (Spain)
- 7797 0W **Three-dimensional floating display by concave cylindrical mirror and tracking technology** [7797-32]
G. Park, J. Yeom, Seoul National Univ. (Korea, Republic of); S.-W. Min, Kyung Hee Univ. (Korea, Republic of); B. Lee, Seoul National Univ. (Korea, Republic of)

POSTER SESSION

- 7797 0X **The parallel spectrum analyzer of optical signals** [7797-33]
M. A. Vaganov, O. D. Moskaletz, L. N. Preslenev, I. N. Arkhipov, St. Petersburg State Univ. of Aerospace Instrumentation (Russian Federation)
- 7797 0Y **Resolution of overlapping skin auto-fluorescence for development of non-invasive applications** [7797-34]
Y.-Z. Su, Instrument Technology Research Ctr. (Taiwan); L.-W. Lin, C.-Y. Chen, National Univ. of Kaohsiung (Taiwan); M.-W. Hung, K.-C. Huang, Instrument Technology Research Ctr. (Taiwan)
- 7797 0Z **Design and image processing for tactile endoscope system** [7797-35]
K. Yamada, Y. Susuki, T. Nagakura, K. Ishihara, Y. Ohno, Osaka Univ. (Japan)

- 7797 10 **Image processing algorithm of equiarm delay line in SAIL** [7797-36]
N. Xu, L. Liu, W. Lu, Shanghai Institute of Optics and Fine Mechanics (China)
- 7797 11 **Disparity estimation based on integral imaging in sub-pixel resolution using maximum a priori (MAP) registration** [7797-37]
J.-H. Jung, K. Hong, Seoul National Univ. (Korea, Republic of); J.-H. Park, Chungbuk National Univ. (Korea, Republic of); I. Chung, B. Lee, Seoul National Univ. (Korea, Republic of)
- 7797 12 **Optical bistability in a nonlinear SOA-based fiber ring resonator** [7797-38]
P. A. Costanzo-Caso, Rose-Hulman Institute of Technology (United States), Ctr. de Investigaciones Ópticas (Argentina), and Univ. Nacional de La Plata (Argentina); Y. Jin, S. Granieri, A. Siahmakoun, Rose-Hulman Institute of Technology (United States)
- 7797 13 **Edge enhancement methods based on derivative operations** [7797-39]
J. L. Flores, Univ. de Guadalajara (Mexico); J. A. Ferrari, Univ. de la República (Uruguay)
- 7797 15 **Efficient CGH generation of three-dimensional objects using line-redundancy and novel-look-up table method** [7797-41]
W.-Y. Choe, S.-C. Kim, E.-S. Kim, Kwangwoon Univ. (Korea, Republic of)
- 7797 16 **Reduction of LUT size using the relationship between pixel-pitch and reconstruction distance** [7797-42]
J.-H. Kim, S.-C. Kim, E.-S. Kim, Kwangwoon Univ. (Korea, Republic of)
- 7797 17 **Hybrid raised-cosine spiral phase filter for optimized optical image processing with edge enhancement** [7797-43]
N. Zhang, Nanyang Technological Univ. (Singapore); X. Yuan, Nankai Univ. (China)
- 7797 19 **The challenge of scheduling user transmissions on the downlink of a long-term evolution (LTE) cellular communication system** [7797-45]
B. Alhasson, M. Matin, Univ. of Denver (United States)
- 7797 1A **LTE-advanced MIMO uplink for mobile system** [7797-46]
B. Alhasson, X. Li, A. M. Bloul, M. Matin, Univ. of Denver (United States)
- 7797 1B **Simulation of OFDM technique for wireless communication systems** [7797-47]
A. Bloul, S. Mohseni, B. Alhasson, M. Ayad, M. A. Matin, Univ. of Denver (United States)
- 7797 1C **Telemedicine optoelectronic biomedical data processing system** [7797-48]
V. V. Prosolovska, Vinnytsia State Technical Univ. (Ukraine)
- 7797 1D **Radon-Wigner transform processing for optical communication signals** [7797-49]
L. A. Bulus-Rossini, P. A. Costanzo-Caso, R. Duchowicz, Ctr. de Investigaciones Ópticas (Argentina) and Univ. Nacional de La Plata (Argentina); E. E. Sicre, Univ. Argentina de la Empresa (Argentina)

7797 1E **Simultaneous recognition and classification of multiple objects with a complex composite filter [7797-50]**
O. G. Campos-Trujillo, V. H. Diaz-Ramirez, Ctr. de Investigación y Desarrollo de Tecnología Digital (Mexico)

Author Index

Conference Committee

Program Track Chair

Khan M. Iftekharuddin, The University of Memphis (United States)

Conference Chairs

Abdul Ahad Sami Awwal, Lawrence Livermore National Laboratory
(United States)
Khan M. Iftekharuddin, The University of Memphis (United States)
Scott C. Burkhart, Lawrence Livermore National Laboratory
(United States)

Program Committee

Henri H. Arsenault, University Laval (Canada)
Stephen G. Azevedo, Lawrence Livermore National Laboratory
(United States)
George Barbastathis, Massachusetts Institute of Technology
(United States)
Juan Campos, Universidad Autònoma de Barcelona (Spain)
David P. Casasent, Carnegie Mellon University (United States)
H. John Caulfield, Alabama A&M University (United States) and
Diversified Research Corporation (United States)
Pietro Ferraro, Istituto Nazionale di Ottica Applicata (Italy)
Laurence G. Hassebrook, University of Kentucky (United States)
Kazuyoshi Itoh, Osaka University (Japan)
Mohammad A. Karim, Old Dominion University (United States)
Laura Mascio Kegelmeyer, Lawrence Livermore National Laboratory
(United States)
Byoungho Lee, Seoul National University (Korea, Republic of)
Abhijit Mahalanobis, Lockheed Martin Missiles and Fire Control
(United States)
Mohammed A. Matin, University of Denver (United States)
Osamu Matoba, Kobe University (Japan)
Alastair D. McAulay, Lehigh University (United States)
Nasser M. Nasrabadi, U.S. Army Research Laboratory (United States)
Thomas J. Naughton, National University of Ireland, Maynooth (Ireland)
Takanori Nomura, Wakayama University (Japan)
Ting-Chung Poon, Virginia Polytechnic Institute and State University
(United States)
Philippe Réfrégier, Institut Fresnel (France)
Joseph Rosen, Ben-Gurion University of the Negev (Israel)

Firooz A. Sadjadi, Lockheed Martin Maritime Systems & Sensors
(United States)
John T. Sheridan, University College Dublin (Ireland)
Enrique Tajahuerce, Universidad Jaume I (Spain)
Jun Tanida, Osaka University (Japan)
Shyh-Lin Tsao, Cherry Tree Consulting Company (Taiwan) and National Taiwan Normal University (Taiwan)
Cardinal Warde, Massachusetts Institute of Technology (United States)
Frank Wyrowski, Friedrich-Schiller-Universität Jena (Germany)
Toyohiko Yatagai, Utsunomiya University (Japan)
Francis T. S. Yu, The Pennsylvania State University (United States)
Maria Josefa Yzuel, Universidad Autònoma de Barcelona (Spain)

Session Chairs

- 1 Optical Interconnects/Network
Mohammed A. Matin, University of Denver (United States)
- 2 Signal/Image Processing I
Alastair D. McAulay, Lehigh University (United States)
- 3 Signal/Image Processing II
Stephen G. Azevedo, Lawrence Livermore National Laboratory (United States)
- 4 Optical Logic/Computing
Abdul Ahad Sami Awwal, Lawrence Livermore National Laboratory (United States)
Mozammel H. A. Khan, East West University (Bangladesh)
- 5 Optical Imaging
Laurent Hilsz, Commissariat à l'Énergie Atomique (France)
- 6 Electro-optical Display
Scott C. Burkhart, Lawrence Livermore National Laboratory (United States)
- 7 3D-Display
Keiichiro Kagawa, Osaka University (Japan)