Current Developments in Lens Design and Optical Engineering XVIII

R. Barry Johnson
Virendra N. Mahajan
Simon Thibault
Editors

7–8 August 2017
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 10375
Contents

vii  Authors
ix  Conference Committee
xi  Introduction

SESSION 1  LENS DESIGN METHODOLOGY I

10375 02  New tools for the design of freeform mirrors [10375-1]
10375 03  Design of light guide sleeve on hyperspectral imaging system for skin diagnosis [10375-2]
10375 05  Achieving linearity with an optical quadrant detector tracking system [10375-4]

SESSION 2  MATERIALS AND COATINGS

10375 06  Multi-band filter design with less total film thickness for short-wave infrared [10375-5]
10375 08  Introducing the quantum efficiency of fluorescence of SCHOTT optical glasses [10375-7]
10375 09  Cryogenic refractive index of Heraeus homosil glass [10375-8]

SESSION 3  ANALYSIS AND APPLICATIONS

10375 0A  Wavefront analysis from its slope data [10375-43]
10375 0B  Parametric diffraction efficiency of non-paraxial sinusoidal reflection gratings [10375-44]
10375 0C  Camera System MTF: combining optic with detector [10375-9]
10375 0D  Diffraction and geometrical optical transfer functions: calculation time comparison [10375-10]
10375 0F  Linear decomposition of the optical transfer function for annular pupils [10375-12]
10375 0G  Assembly of a micro-optical resonator based on silicon micro mirrors for use in gyroscopes [10375-13]
SESSION 4  OPTICAL FABRICATION AND TUNABLE OPTICS

10375 0H  Fabrication of multi-focal microlens array on curved surface for wide-angle camera module [10375-14]
10375 0I  The effect of optical system design for laser micro-hole drilling process [10375-15]
10375 0K  Zoom system without moving element by using two liquid crystal lenses with spherical electrode [10375-17]
10375 0L  Tunable refraction power by mutual rotation of helical lens parts [10375-18]

SESSION 5  SOLID STATE SMART LIGHTING

10375 0M  Optical modeling of bullet-shaped LED for use in self-luminous traffic signs [10375-19]
10375 0N  Visual ergonomic evaluations on four different designs of LED traffic signs [10375-20]
10375 0O  Smart lighting using a liquid crystal modulator [10375-21]
10375 0Q  Combining the transformation and the integration methods to design a refractive lens-array for signal lighting applications [10375-23]

SESSION 6  LENS DESIGN METHODOLOGY II

10375 OR  Development of the infrared instrument for gas detection [10375-24]
10375 OS  Optical design of an athermalised dual field of view step zoom optical system in MWIR [10375-25]
10375 OT  Contact lens design with slope-constrained Q-type aspheres for myopia correction [10375-26]

POSTER SESSION

10375 OU  A lazy way to design infrared lens [10375-27]
10375 OV  Design of two-dimensional (crossed) grating calculation in Czerny-Turner spectrometer with usage of freeform mirrors [10375-28]
10375 OW  Design of off-axial Gregory telescope design with freeform mirror corrector [10375-29]
10375 OY  Optimization of wavefront coding imaging system using heuristic algorithms [10375-31]
10375 OZ  Optical schemes for compact space objectives [10375-32]
10375 10  Infrared simulation and performance validation of pinhole and 4-bar collimator targets for static performance evaluation of thermal imaging systems [10375-33]
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Mask in thickness uniformity for three coating materials</td>
<td>10375-34</td>
</tr>
<tr>
<td>12</td>
<td>Using a two-lens afocal compensator for thermal defocus correction of catadioptric system</td>
<td>10375-35</td>
</tr>
<tr>
<td>13</td>
<td>The improved optical setup for Abbe-Porter experiment</td>
<td>10375-36</td>
</tr>
<tr>
<td>14</td>
<td>Development of surgical binoculars on the basis of polymeric lenses</td>
<td>10375-37</td>
</tr>
<tr>
<td>15</td>
<td>Optical spherometer for measuring large curvature radii of convex surfaces</td>
<td>10375-38</td>
</tr>
<tr>
<td>17</td>
<td>Ray tracing for inhomogeneous media applied to the human eye</td>
<td>10375-40</td>
</tr>
</tbody>
</table>
Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Abou-El-Hossein, Khaled, 0T
Acosta, Eva, 0A
Alvarado Martínez, Jorge de Jesús, 15
Andersen, Torben B., 0C
Antonenko, V., 13
Aouani, Dina, 05
Bakholdin, A. V., 0Z, 12
Baril, Alexandre, 0O
Bazhanov, Yuriy, 0V, 0W
Borovytsky, V., 13
Butylkina, K. D., 0Z
Camacho Bello, Cesar Joel, 15
Chang, Chao-Hsin, 03
Chen, Chia-Ray, 0R
Chen, Ching-Wei, 0R
Chen, Jian-Wei, 11
Chen, LongJiang, 0U
Chen, Pang-Shiu, 11
Chen, Po-Han, 06
Chen, Sheng-Hui, 06
Chen, Yi-Chun, 0M, 0N
Cheng, Yuan-Chieh, 0T
Cherkashina, Rasima, 0V
Chiang, Hou-Chi, 03
Chien, I-Pen, 06
Chien, Yu-Lun, 0I
Demura, Elena, 0V
Díaz, José Antonio, 0D
Diaz-Gonzalez, G., 17
Dietzel, A., 0G
Dilworth, Donald C., 02
Ding, Chien-Fang, 0I
Doherty, Victor J., 0S
Ekimenkova, Alisa, 14
Elsmann, Frank, 0B
Engel, Axel, 0B
Essameldin, Mahmoud, 0Q
Fleischmann, Friedrich, 0Q
Flügge, J., 0G
Galstian, Tigran, 0Q
González-Amador, E., 0Y
Granger, Zachary A., 0C
Harvey, James E., 08
Henning, Thomas, 0Q
Ho, Cheng-Fang, 0T
Hsu, Wei-Yao, 0T
Hu, BaiZhen, 0U
Huang, Ting-Wei, 03
Huang, Ting-Yuan, 0N
Hudz, O., 13
Ilturbe-Castillo, M. D., 17
Ivanov, S. E., 12
Jaing, Cheng-Chung, 11
Jedamzik, Ralf, 0B
Juarez-Salazar, R., 17
Kucukcelebi, Doruk, 0S, 10
Lan, Yin-Te, 0I
Lang, Walter, 0Q
Leber, I., 0G
Lee, Ted L., 0M
Lee, Tsung-Xian, 0N
Leviton, Douglas B., 09
Lin, Chia-Ping, 0K
Liou, Yeuh-Yeong, 11
Mahajan, Virendra N., 0A, 0D
Martin, Thomas, 0L
Miller, Kevin H., 09
Niesel, T., 0G
Ou-Yang, Mang, 03, 06
Padilla-Vivanco, A., 0Y
Pan, Jun-Gu, 0H
Pang, HaoJun, 0U
Peng, Wei-Jei, 0T
Petzold, Uwe, 0B
Pfisterer, Richard N., 0B
Pleitz, Jana, 08
Qi, RongSheng, 0U
Quijada, Manuel A., 09
Romanova, G. E., 0Z, 12
Schweigerling, Jim, 0F
Sieber, Ingo, 0L
Stiller, Peter, 0L
Su, Guo-Dung J., 0H, 0K
Sun, Ching-Cherng, 0M, 0N
Thibault, Simon, 0O
Toxqui-Quitl, C., 0Y
Tsai, Ming-Siou, 0M
Tsai, Yi-Chun, 0N
Vázquez y Montiel, Sergio, 15
Vlahco, Vadim, 0V, 0W
Voznesenskaya, Anna, 14
Werner, C., 0G
Wu, Jeng-Fu, 03
Wu, JianDong, 0U
Wu, Kai-Lun, 11
Xie, Jing-Han, 11
Yan, Yung-Jhe, 03, 06
Yang, Ren-Kai, 0K
Young, Hong-Tsu, 0I
Yu, Kun, 0U
Yu, L., 0G
Yu, Zong-Ru, 0T
Zermeño-Loreto, O., 0Y
Conference Committee

Program Track Chair
José Sasián, College of Optical Sciences, The University of Arizona (United States)

Conference Chairs
R. Barry Johnson, Alabama A&M University (United States)
Virendra N. Mahajan, College of Optical Sciences, The University of Arizona (United States)
Simon Thibault, Université Laval (Canada)

Conference Program Committee
Robert M. Bates, FiveFocal LLC (United States)
Julie L. Bentley, University of Rochester (United States)
Florian Bociort, Technische Universiteit Delft (Netherlands)
Robert M. Bunch, Rose-Hulman Institute of Technology (United States)
Pierre H. Chavel, Institut d’Optique (France)
Chung-Tse Chu, The Aerospace Corporation (United States)
Apostolos Deslis, JENOPTIK Optical Systems (United States)
José Antonio Díaz Navas, Universidad de Granada (Spain)
James E. Harvey, Photon Engineering LLC (United States)
Lakshminarayan Hazra, University of Calcutta (India)
Irina L. Livshits, National Research University of Information Technologies, Mechanics and Optics (Russian Federation)
Steven A. Macenka, Jet Propulsion Laboratory (United States)
Michael Mandina, Optimax Systems, Inc. (United States)
Pantazis Mouroulis, Jet Propulsion Laboratory (United States)
Alfonso Padilla-Vivanco, Universidad Politécnica de Tulancingo (Mexico)
Ching-Cherng Sun, National Central University (Taiwan)
Yuzuru Takashima, College of Optical Sciences, The University of Arizona (United States)
Yongtian Wang, Beijing Institute of Technology (China)
Cornelius Willers, Council for Scientific and Industrial Research (South Africa)
Andrew P. Wood, Qioptiq Ltd. (United Kingdom)
María J. Yzuel, Universitat Autònoma de Barcelona (Spain)
Session Chairs

1. Lens Design Methodology I
   R. Barry Johnson, Alabama A&M University (United States)

2. Materials and Coatings
   Robert M. Bunch, Rose-Hulman Institute of Technology (United States)

3. Analysis and Applications
   Pantazis Mouroulis, Jet Propulsion Laboratory (United States)

4. Optical Fabrication and Tunable Optics
   Virendra N. Mahajan, College of Optical Sciences, The University of Arizona (United States)

5. Solid State Smart Lighting
   Ching-Cherng Sun, National Central University (Taiwan)

6. Lens Design Methodology II
   Robert M. Bunch, Rose-Hulman Institute of Technology (United States)
Introduction

We accepted forty-four papers, including sixteen posters, and organized them into six sessions. We had two sessions on Lens Design Methodology, and one each on Materials and Coatings, Analysis and Applications, Optical Fabrication and Tunable Optics, and Solid State Smart Lighting. Taiwan contributed the most papers (12), followed by USA (9), the Russian Federation (6), Mexico (6), Germany (4), Canada (2), Turkey (2), and one each from China, Korea, and Ukraine. Two of the USA papers have coauthors from Spain. Similarly, two of the Russian papers have coauthors from Singapore, and one from Taiwan has a coauthor from South Africa. All of the papers from Mexico were Posters. The Proceedings consists of 35 papers. The missing nine papers include four posters, three of which are from Mexico. One invited paper was preplanned to be completed later for publication in Optical Engineering, one presenter had visa problem, another had publication conflicts, and the others were no-shows. Lack of travel funding contributed to some of the no-shows.

R. Barry Johnson
Virendra N. Mahajan
Simon Thibault