PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 6616

, "Front Matter: Volume 6616," Proc. SPIE 6616, Optical Measurement Systems for Industrial Inspection V, 661601 (18 June 2007); doi: 10.1117/12.747152

SPIE.

Event: Optical Metrology, 2007, Munich, Germany

PROCEEDINGS OF SPIE

Optical Measurement Systems for Industrial Inspection V

**Wolfgang Osten
Christophe Gorecki
Erik L. Novak**
Editors

**18–22 June 2007
Munich, Germany**

Sponsored by
SPIE Europe

Cooperating Organizations
EOS—European Optical Society
WLT—Wissenschaftliche Gesellschaft Lasertechnik e.V. (Germany)

Published by
SPIE

Volume 6616

Proceedings of SPIE, 0277-786X, v. 6616

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 *Optical Measurement Systems for Industrial Inspection V*, edited by Wolfgang Osten, Christophe Gorecki, Erik L. Novak, Proceedings of SPIE Vol. 6616 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 0277-786X
ISBN 9780819467584

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 © 2007, 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/07/\$18.00.

Printed in the United States of America.

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

SPIE
Digital Library

SPIDigitalLibrary.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

Part One

xvii	Conference Committee
xxi	Introduction

ADVANCED SENSOR SOLUTIONS: OPTICAL SENSORS

6616 04	Paradigm shifts in optical coherence tomography (Invited Paper) [6616-01] R. A. Leitgeb, École Polytechnique Fédérale de Lausanne (Switzerland)
6616 05	White light spectral interferometric technique used to measure thickness of thin films [6616-02] P. Hlubina, D. Ciprian, R. Clebus, J. Luňáček, M. Lesňák, Technical Univ. Ostrava (Czech Republic)
6616 06	Dual-wavelength vertical scanning low-coherence interference microscopy [6616-03] J. Niehues, P. Lehmann, Mahr GmbH (Germany)
6616 07	White-light interferometry in combination with a nanopositioning and nanomeasuring machine (NPMM) [6616-04] D. Kapusi, T. Machleidt, Technische Univ. Ilmenau (Germany); K.-H. Franke, Technische Univ. Ilmenau (Germany) and Zentrum für Bild- und Signalverarbeitung Ilmenau e.V. (Germany); R. Jahn, Zentrum für Bild- und Signalverarbeitung Ilmenau e.V. (Germany)
6616 08	Vertical scanning interferometry with a mixed-coherence light source [6616-05] G. Molnar, R. Tutsch, Technische Univ. Braunschweig (Germany)
6616 09	A method for edge detection of textile preforms using a light-section sensor for the automated manufacturing of fibre-reinforced plastics [6616-07] R. Schmitt, A. Orth, C. Niggemann, RWTH Aachen Univ. (Germany)
6616 0A	Real-time multicamera system for measurement of 3D coordinates by pattern projection [6616-08] V. Sainov, E. Stoykova, J. Harizanova, Central Lab. of Optical Storage and Processing of Information (Bulgaria)
6616 0B	3D shape measurement with phase correlation based fringe projection [6616-09] P. Kühmstedt, C. Munckelt, M. Heinze, C. Bräuer-Burchardt, G. Notni, Fraunhofer-Institute for Applied Optics and Precision Engineering (Germany)
6616 0C	Time-of-flight based pixel architecture with integrated double-cathode photodetector [6616-10] K. Oberhauser, G. Zach, A. Nemecek, H. Zimmermann, Vienna Univ. of Technology (Austria)
6616 0D	Photon-noise limited distance resolution of optical metrology methods (Invited Paper) [6616-06] P. Seitz, Swiss Ctr. for Electronics and Microtechnology (Switzerland) and Univ. of Neuchâtel (Switzerland)

- 6616 OE **The confocal Raman AFM: a powerful tool for the characterization of surface coatings** [6616-11]
U. Schmidt, W. Ibach, J. Mueller, O. Hollricher, WITec GmbH (Germany)
- 6616 OF **Point-diffraction interferometer by electro-optic effect in lithium niobate crystals** [6616-106]
M. Paturzo, S. Grilli, P. Ferraro, Istituto Nazionale di Ottica Applicata, CNR (Italy)
- 6616 OG **Super-heterodyne laser interferometer using femtosecond frequency comb for linear encoder calibration system** [6616-13]
M. Kajima, H. Matsumoto, National Institute of Advanced Industrial Science and Technology (Japan)
- 6616 OH **Differential signal scatterometry overlay metrology: an accuracy investigation** [6616-14]
D. Kandel, M. Adel, B. Dinu, B. Golovanevsky, P. Izikson, V. Levinski, I. Vakshtein, KLA-Tencor Corp. (Israel); P. Leray, IMEC (Belgium); M. Vasconi, STMicroelectronics (Italy); B. Salski, QWED Sp. z o.o. (Poland)
- 6616 OI **Improved microinterferometric tomography method for reconstruction of refractive index** [6616-15]
P. Książewski, M. Kujawińska, Warsaw Univ. of Technology (Poland)
- 6616 OJ **High-resolution tomographic interferometry of optical phase elements** [6616-16]
W. Gorski, S. Rafler, W. Osten, Institut für Technische Optik (Germany)
- 6616 OK **Properties of the DMD digital micromirror device for new emerging applications in optical engineering (Invited Paper)** [6616-17]
C. Dunn, Texas Instruments, Inc. (USA); R. Höfling, ViALUX GmbH (Germany)
- 6616 OL **Realisation of quantitative Makyoh topography using a digital micromirror device** [6616-18]
F. Riesz, I. E. Lukács, J. P. Makai, Research Institute for Technical Physics and Materials Science (Hungary)
- 6616 OM **A beam halo monitor based on adaptive optics** [6616-19]
C. P. Welsch, E. Bravin, T. Lefèvre, CERN (Switzerland)
- 6616 ON **Realisation of a holographic microlaser scalpel using a digital micromirror device** [6616-20]
S. Zwick, M. Warber, T. Haist, W. Osten, Univ. Stuttgart (Germany)
- 6616 OO **Digital micromirror device application for inline characterization of solar cells by tomographic light-beam-induced current imaging** [6616-21]
R. Gupta, O. Breitenstein, Max Planck Institute of Microstructure Physics (Germany)
- 6616 OR **External-cavity diode laser utilizing a micromirror device for spectral tuning** [6616-24]
M. Breede, C. Kasseck, C. Brenner, N. C. Gerhardt, Ruhr-Univ., Bochum (Germany); R. Höfling, ViALUX Messtechnik + Bildverarbeitung GmbH (Germany); M. Hofmann, Ruhr-Univ., Bochum (Germany)
- 6616 OS **In situ monitoring of periodic domain formation in ferroelectric crystals** [6616-25]
S. Grilli, M. Paturzo, L. Miccio, P. Ferraro, Istituto Nazionale di Ottica Applicata del CNR (Italy)

- 6616 OT **Dispersive white light interferometry for 3D inspection of thin film layers of flat panel displays** [6616-96]
Y.-S. Ghim, J. You, S.-W. Kim, Korea Advanced Institute of Science and Technology (South Korea)
- 6616 OU **DLP-based fringe projection as an optical 3D inline measuring method for inspection in manufacturing** [6616-85]
G. Frankowski, M. Stenzel, GFMesstechnik GmbH (Germany)
- 6616 OV **Polarization correlometry of polarization singularities of biological tissues object fields** [6616-28]
O. V. Angelsky, A. G. Ushenko, A. O. Angelska, Yu. A. Ushenko, Chernivtsi National Univ. (Ukraine)
- 6616 OW **Fluid mechanics measurement based on the anisotropic core structure of pseudophase singularities in analytic signal representation of speckle pattern** [6616-29]
W. Wang, The Univ. of Electro-Communications (Japan); M. R. Dennis, Univ. of Southampton (United Kingdom); R. Ishijima, T. Yokozeki, A. Matsuda, The Univ. of Electro-Communications (Japan); S. G. Hanson, Risø National Laboratory (Denmark); M. Takeda, The Univ. of Electro-Communications (Japan)
- 6616 OX **Coherent fringe projector for 3D surface profilometry** [6616-103]
P. Tavares, N. Viriato, J. Reis, M. Vaz, Porto Univ. (Portugal)
- 6616 OY **W-band speckle contrast images for inspection of concealed objects** [6616-31]
I. Jaeger, L. Zhang, J. Stiens, G. Koers, H. Sahli, R. Vounckx, Vrije Univ. Brussel (Belgium)
- 6616 OZ **About the possibility of using optical bistability effect in metrology systems** [6616-32]
C. Yu, Zenkova, Chernivtsi National Univ. (Ukraine)

ADVANCED SENSOR SOLUTIONS: PHASE RETRIEVAL

- 6616 10 **Reaching lambda/100 resolution in static fringes interferometry using linear prediction** [6616-33]
M. Mestre, École Normale Supérieure de Cachan (France); D. Pasquelin, Optics-Concept (France); P. Flug, Opticsfab (Germany)
- 6616 11 **Composition of virtual speckle pattern for spatial fringe analysis method in ESPI by using single camera** [6616-34]
Y. Arai, R. Shimamura, Kansai Univ. (Japan); S. Yokozeki, Jyokou Applied Optics Lab. (Japan)
- 6616 12 **Phase measurement errors due to holographic interferograms compression** [6616-36]
E. Darakis, Univ. of Strathclyde (United Kingdom); V. R. Singh, A. K. Asundi, Nanyang Technological Univ. (Singapore); J. J. Soraghan, Univ. of Strathclyde (United Kingdom)
- 6616 13 **Fourier-based design of asynchronous phase detection algorithms** [6616-35]
J. A. Gómez-Pedrero, Univ. Complutense de Madrid (Spain); D. Crespo, Indizen Optical Technologies (Spain); J. A. Quiroga, Univ. Complutense de Madrid (Spain)
- 6616 14 **Phase retrieval based on wavefront modulation** [6616-37]
F. Zhang, G. Pedrini, W. Osten, Univ. Stuttgart (Germany)

- 6616 15 **Real-time dual-wavelength digital holographic microscopy with a single hologram** [6616-38]
J. Kühn, École Polytechnique Fédérale de Lausanne (Switzerland); T. Colomb, École Polytechnique Fédérale de Lausanne (Switzerland) and Ctr. Hospitalier Univ. Vaudois (Switzerland); F. Montfort, Lyncée Tec SA (Switzerland); F. Charrière, C. Depeursinge, École Polytechnique Fédérale de Lausanne (Switzerland)

- 6616 16 **Fast demodulation technique for a quasi-distributed temperature sensor** [6616-39]
C. Crunelle, M. Wuilpart, C. Caucheteur, P. Mégret, Faculté Polytechnique de Mons (Belgium)

ADVANCED SENSOR SOLUTIONS: ALGORITHMS

- 6616 18 **Stability analysis for the TMS method: influence of high spatial frequencies** [6616-41]
A. Wiegmann, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany); C. Elster, Physikalisch-Technische Bundesanstalt, Berlin (Germany); R. D. Geckeler, M. Schulz, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)
- 6616 19 **Characterization and compensation of decorrelations in interferometric set-ups using active optics** [6616-42]
E. Hällstig, Optronic (Sweden); A. Svanbro, Luleå Univ. of Technology (Sweden)
- 6616 1A **S-transform analysis of projected fringe patterns** [6616-43]
Ö. Kocahan, S. Özder, E. Coşkun, Çanakkale Onsekiz Mart Univ. (Turkey)
- 6616 1B **An efficient mesh oriented algorithm for 3D measurement in multiple camera fringe projection** [6616-44]
A. V. Fantin, A. Albertazzi, T. L. Pinto, Federal Univ. of Santa Catarina (Brazil)
- 6616 1C **A complete digital optics applied to digital holographic microscopy: application to chromatic aberration compensation** [6616-45]
T. Colomb, Centre Hospitalier Univ. Vaudois (Switzerland) and École Polytechnique Fédérale de Lausanne (Switzerland); F. Charrière, J. Kühn, École Polytechnique Fédérale de Lausanne (Switzerland); F. Montfort, Lyncée Tec SA (Switzerland); C. Depeursinge, École Polytechnique Fédérale de Lausanne (Switzerland)
- 6616 1D **3D defect detection using optical wide-field microscopy** [6616-46]
V. Tynpel, M. Schaaf, Jentech Engineering GmbH (Germany); B. Srocka, HSEB Dresden GmbH (Germany)
- 6616 1E **A novel algorithm to stitch adjacent cloud of points of long cylindrical surfaces** [6616-47]
M. R. Viotti, A. Albertazzi, Univ. Federal de Santa Catarina (Brazil); A. Dal Pont, Photonical Instruments for Technical Applications (Brazil); A. V. Fantin, Univ. Federal de Santa Catarina (Brazil)

ADVANCED SENSOR SOLUTIONS: POSTER SESSION

- 6616 1F **White-light spectral interferometric techniques used to measure the group dispersion of isotropic and anisotropic optical elements** [6616-99]
P. Hlubina, D. Ciprian, R. Chlebus, Technical Univ. Ostrava (Czech Republic)

- 6616 1G **Designing a new optical sensor using wide band speckle patterns** [6616-100]
H. El Ghandoor, Ain Shams Univ. (Egypt); A. F. El Sherif, M. Darwish, Military Technical College (Egypt)
- 6616 1H **Implementation a new real-time structure for driving an IRFPA and image enhancement** [6616-101]
A. Homaei, Rayan Electronic Farda Co. (Iran) and Azad Univ. (Iran); E. Koohestani, Rayan Electronic Farda Co. (Iran)
- 6616 1I **New features of Doppler-free saturated-absorption resonance in field of counterpropagating waves** [6616-102]
D. V. Brazhnikov, Institute of Laser Physics (Russia); A. V. Taichenachev, Institute of Laser Physics (Russia) and Novosibirsk State Univ. (Russia); A. M. Tumaikin, Institute of Laser Physics (Russia); V. I. Yudin, Institute of Laser Physics (Russia) and Novosibirsk State Univ. (Russia); S. A. Zibrov, Y. O. Dudin, P. A. Siushev, A. G. Radnaev, V. V. Vasil'ev, V. L. Velichansky, Lebedev Physical Institute (Russia)
- 6616 1J **Multidirectional holographic interferometer with dodecagon geometry** [6616-104]
M. Antoř, Brno Univ. of Technology (Czech Republic)
- 6616 1K **Multi-resolution optical 3D sensor** [6616-105]
P. Kühmstedt, M. Heinze, I. Schmidt, M. Breitbarth, G. Notni, Fraunhofer-Institute for Applied Optics and Precision Engineering (Germany)
- 6616 1L **Effective dynamic range measurement for a CCD in full-field industrial x-ray imaging applications** [6616-107]
M. Bettuzzi, R. Brancaccio, M. P. Morigi, F. Casali, Univ. of Bologna (Italy)
- 6616 1M **White-light Fourier spectrometer: Monte Carlo noise analysis and test measurements** [6616-109]
E. Stoykova, B. Ivanov, Central Lab. of Optical Storage and Processing of Information (Bulgaria)
- 6616 1N **Non-contact torsion transducer based on the measurement of Moiré patterns using plastic optical fibres** [6616-110]
M. Lomer, Univ. de Cantabria (Spain); K. Contreras, Pontificia Univ. Católica del Perú (Peru)
- 6616 1O **Special lenslet array with long focal length range for Shack-Hartmann Wavefront Sensor** [6616-111]
L. P. Zhao, N. Bai, X. Li, Z. P. Fang, Singapore Institute of Manufacturing Technology (Singapore); A. A. Hein, Z. W. Zhong, Nanyang Technological Univ. (Singapore)
- 6616 1Q **Influences of linear birefringence on bulk glass current sensors with return-back optical paths** [6616-114]
Z. Wang, X. Liu, Z. Huang, Harbin Engineering Univ. (China)
- 6616 1R **Influences of reciprocal parameters upon a Faraday-mirror typed OCT** [6616-115]
Z. Huang, Z. Wang, X. Liu, C. Kang, Harbin Engineering Univ. (China)
- 6616 1S **Orthogonal conjugate reflecting current sensor** [6616-116]
Z. Huang, Z. Wang, H. Wang, Harbin Engineering Univ. (China)

- 6616 1U **Optical fiber rotation sensor for application in oil refinery and high electromagnetic noise environment** [6616-167]
T. R. Woliński, D. Budaszewski, A. W. Domański, S. Ertman, Warsaw Univ. of Technology (Poland); G. Goleniewski, M. Wydmański, Orlen Refinery (Poland)
- 6616 1V **Method of optical axis determination in crystals by use of light depolarization measurements** [6616-168]
A. W. Domanski, D. Budaszewski, P. Poziemski, T. R. Wolinski, Warsaw Univ. of Technology (Poland)

SHAPE MEASUREMENT: INTERFEROMETRY

- 6616 1W **Derivation of quasi-parallel glass plate parameters tested in a Fizeau interferometer** [6616-48]
A. Styk, K. Patorski, Warsaw Univ. of Technology (Poland)
- 6616 1X **Influence of non-linearities in wavelength-swept absolute distance interferometry** [6616-49]
L. Perret, P. Pfeiffer, A. Chakari, Univ. Louis Pasteur (France)
- 6616 1Y **Proposal on MEMS-based interferometric profiler for in-situ etching depth control** [6616-50]
A. G. Smirnov, Institute of Physics (Belarus); J. Schreiber, Fraunhofer-Institut für Zerstörungsfreie Prüfverfahren (Germany); U. Richter, Sentech Instruments GmbH (Germany); I. Wullinger, Fraunhofer Institut für Photonische Mikrosysteme (Germany)
- 6616 1Z **Improving the measurement of thick and thin films with optical profiling techniques** [6616-51]
C. Cadevall, C. Oriach-Font, R. Artigas, A. Pintó, F. Laguarda, Technical Univ. of Catalonia (Spain)
- 6616 20 **Interferometry of thick and thin films** [6616-52]
M. Conroy, Taylor Hobson, Ltd. (United Kingdom)

SHAPE MEASUREMENT: MICRO AND NANO STRUCTURES

- 6616 21 **Precision mechatronics based on high-precision measuring and positioning systems and machines (Invited Paper)** [6616-53]
G. Jäger, E. Manske, T. Hausotte, R. Mastlylo, N. Dorozhovets, N. Hofmann, Technische Univ. Ilmenau (Germany)
- 6616 22 **Experimental validation of 20nm sensitivity of singular beam microscopy** [6616-54]
B. Spektor, A. Normatov, J. Shamir, Technion-Israel Institute of Technology (Israel)
- 6616 23 **Measuring 3D geometries of microstructures with the laser-scanning confocal vibrometer microscope** [6616-55]
C. Rembe, S. Bödecker, B. Armbruster, M. Bauer, Polytec GmbH (Germany)
- 6616 24 **Application of the metrological scanning probe microscope for high-precision, long-range, traceable measurements** [6616-56]
N. Dorozhovets, T. Hausotte, G. Jäger, E. Manske, Technische Univ. Ilmenau (Germany)

- 6616 25 **Grating projection Moiré interferometry for high-speed 3D inspection of mesoscale objects** [6616-57]
S.-Y. Lee, M.-G. Kang, IntekPlus Co. (South Korea); S.-W. Kim, Korea Advanced Institute of Science and Technology (South Korea)
- 6616 26 **Artefacts with rough surfaces for verification of optical microsensors** [6616-58]
W. Ehrig, U. Neuschaefer-Rube, Physikalisch-Technische Bundesanstalt, Braunschweig (Germany)

SHAPE MEASUREMENT: WAVEFRONT SENSING

- 6616 27 **Superposition fringes for profiling applications** [6616-59]
J. Schwider, Institute of Optics, Information and Photonics (Germany)
- 6616 28 **Using phase objects to qualify the transfer function of Fizeau interferometers for high spatial frequencies** [6616-60]
S. Bouillet, J. Daurios, Commissariat à l'Energie Atomique (France)
- 6616 29 **New technique for flexible and rapid measurement of precision aspheres** [6616-61]
E. Garbusi, C. Pruss, J. Liesener, W. Osten, Univ. Stuttgart (Germany)
- 6616 2A **Surface metrology with a stitching Shack-Hartmann profilometric head** [6616-62]
J. Floriot, X. Levecq, S. Bucourt, Imagine Optic (France); M. Thomasset, F. Polack, M. Idir, P. Mercère, S. Brochet, T. Moreno, Synchrotron Soleil (France)

Part Two

SHAPE MEASUREMENT: INSPECTION OF MICRO AND MACRO STRUCTURES

- 6616 2C **Large-scale full-field metrology using projected fringes: some challenges and solutions** [6616-64]
J. M. Huntley, T. Ogundana, Loughborough Univ. (United Kingdom); R. L. Burguete, Airbus UK (United Kingdom); C. R. Coggrave, Phase Vision, Ltd. (United Kingdom)
- 6616 2D **Optical scanner for the measurement of surface profile of large size panels: analysis of metrologic performance and measurement uncertainty** [6616-65]
P. Castellini, Univ. Politecnica delle Marche (Italy)
- 6616 2E **Measurement errors of mirrorlike tilted objects in white-light interferometry** [6616-123]
R. Berger, Univ. Stuttgart (Germany); T. Sure, Fachhochschule Gießen-Friedberg (Germany); W. Osten, Univ. Stuttgart (Germany)
- 6616 2F **3D optical measurement of curved edges** [6616-67]
S. Naudet-Collette, F. Gaspard, H. Martinsson, F. Dekeyser, CEA, LIST (France)
- 6616 2G **Optical correlation measurement of surface roughness** [6616-68]
O. V. Angelsky, A. P. Maksimyak, P. P. Maksimyak, Chernivtsi National Univ. (Ukraine)
- 6616 2H **Profile detection by projection of coloured patterns** [6616-69]
D. Fontani, F. Francini, P. Sansoni, D. Jafrancesco, L. Mercatelli, Istituto Nazionale di Ottica Applicata, CNR (Italy)

- 6616 2I **Nonlinearity correction in digital fringe projection profilometry by using histogram matching technique** [6616-70]
H. Guo, Z. Zhao, Shanghai Univ. (China)

SHAPE MEASUREMENT: POSTER SESSION

- 6616 2J **Two-dimensional method for surface determination by optical deflectometry** [6616-118]
A. Moreno, M. Espínola, A. Lizana, J. Campos, Univ. Autónoma de Barcelona (Spain)
- 6616 2K **Optical scan method for fine surface roughness measurement** [6616-119]
Z. Wang, L. Wang, Harbin Engineering Univ. (China)
- 6616 2L **Conical beam-based laser profilometer for testing roller bearings** [6616-120]
N. Khilo, V. Belyi, N. Kazak, A. Mashchenko, P. Ropot, B.I. Stepanov Institute of Physics (Belarus)
- 6616 2M **Correlation method for shape measurement of optical surfaces** [6616-121]
A. Míks, J. Novák, P. Novák, Czech Technical Univ. (Czech Republic)
- 6616 2O **Accurate measurement of intraocular lens parameters** [6616-126]
M. Vannoni, G. Molesini, CNR, Istituto Nazionale di Ottica Applicata (Italy); R. Mencucci, R. Volpe, Univ. of Florence (Italy)

DISPLACEMENT AND STRAIN MEASUREMENT: STATIC DISPLACEMENTS

- 6616 2P **Digital holocameras for laboratory and outdoor measurements of engineering objects** [6616-71]
A. Michalkiewicz, M. Kujawska, Warsaw Univ. of Technology (Poland); K. Stasiewicz, L. R. Jaroszewicz, Military Univ. of Technology (Poland)
- 6616 2Q **Infrared Electronic speckle pattern interferometry at 10 μm** [6616-72]
J.-F. Vandenrijt, M. Georges, Univ. de Liège (Belgium)
- 6616 2R **Stress behavior of ball grid array (BGA) studied by dynamic electronic speckle pattern interferometry (DESPI)** [6616-73]
V. D. Madjarova, S. Toyooka, H. Chida, H. Kadono, Saitama Univ. (Japan)
- 6616 2S **Measurement of surface strain using multi-component pulsed laser shearography with coherent fibre-optic bundles** [6616-74]
D. Francis, S. W. James, R. P. Tatam, Cranfield Univ. (United Kingdom)
- 6616 2T **Application of reflection hologram interferometry with a high resolution to residual stresses characterisation by local material removing** [6616-75]
V. S. Pisarev, V. V. Balalov, Central Aero-Hydrodynamics Institute (Russia)
- 6616 2U **Nematic liquid crystals light valve: application to phase shifting speckle interferometry** [6616-169]
P. Slangen, B. Gautier, Ecole des Mines d'Alès (France)

DISPLACEMENT AND STRAIN MEASUREMENT: DYNAMIC DISPLACEMENTS

- 6616 2V **Advances in optoelectronic methodology for micro- and nano-scale measurements (Invited Paper)** [6616-76]
R. J. Pryputniewicz, Worcester Polytechnic Institute (USA)
- 6616 2W **In-plane displacement measurement with sub-pixel resolution: application to vibration characterization of a shear-force scanning probe** [6616-77]
P. Sandoz, J.-M. Friedt, É. Carry, Univ. de Franche-Comté (France)
- 6616 2X **Measurement of the thermal deformation of a highly stable antenna with pulse ESPI** [6616-78]
E.-H. Nösekabel, Steinbichler Optotechnik GmbH (Germany); T. Ernst, HPS GmbH (Germany); W. Haefker, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)
- 6616 2Z **Projection moiré measurement of the deflection of composite plates subject to bird strike impact** [6616-80]
A. Shulev, Central Lab. of Optical Storage and Processing of Information (Bulgaria); W. Van Paepegem, Ghent Univ. (Belgium); J. Harizanova, Central Lab. of Optical Storage and Processing of Information (Bulgaria); A. Moentjens, J. Degrieck, Ghent Univ. (Belgium); V. Sainov, Central Lab. of Optical Storage and Processing of Information (Bulgaria)
- 6616 30 **Double exposure time-averaged in-line digital holography** [6616-81]
V. R. Singh, A. Asundi, J. Miao, Nanyang Technological Univ. (Singapore)

DISPLACEMENT AND STRAIN MEASUREMENT: POSTER SESSION

- 6616 31 **Deformation analysis in biomaterials using digital speckle interferometry** [6616-127]
R. Salvador, R. González-Peña, R. Cibrián, M. Buendía, Univ. València Estudi General (Spain); F. Mínguez, Hospital Clínico Univ. de Valencia (Spain); V. Micó, J. A. Carrión, J. J. Esteve-Taboada, T. Molina-Jiménez, S. Simón, E. Pérez, AIDO-Technological Institute of Optics, Colour and Imaging (Spain)
- 6616 32 **Quantification of displacement and velocity noise in vibrometer measurements on transversely moving or rotating surfaces** [6616-128]
A. Dräbenstedt, Polytec GmbH (Germany)
- 6616 33 **Development of a 3D dynamic measurement system using a high-speed camera with white-light scanning interference microscopy associated with real-time FPGA image processing** [6616-129]
G. Johnson, P. Montgomery, F. Anstötz, Institut d'Electronique du Solide et des Systèmes, Lab. Commun, CNRS (France); R. Kiefer, Lab. des Systèmes Photoniques, INSA de Strausberg (France)
- 6616 34 **Interferometric characterization of capacitor micromachined ultrasonic transducers and validation by electrical measurements** [6616-130]
H. Martinussen, A. Aksnes, H. E. Engan, A. Rønnekleiv, Norwegian Univ. of Science and Technology (Norway)

NON-DESTRUCTIVE TESTING

- 6616 35 **Fibre grating refractometer sensors for composite process monitoring.** [6616-87]
S. J. Buggy, E. Chehura, A. A. Skordos, A. Dimopoulos, S. W. James, I. K. Partridge,
R. P. Tatam, Cranfield Univ. (United Kingdom)
- 6616 36 **Quantification of defect size in shearing direction by shearography and wavelet transform**
[6616-88]
F. Michel, DEIOS s.a. (Belgium) and Univ. de Liège (Belgium); V. Moreau, DEIOS s.a.
(Belgium); V. Rosso, S. Habraken, Univ. de Liège (Belgium); B. Tilkens, DEIOS s.a. (Belgium)
- 6616 37 **Simulation of the elastic wave propagation in anisotropic microstructures** [6616-89]
J. Bryner, J. Vollmann, D. M. Profunser, J. Dual, ETH Zurich (Switzerland)
- 6616 39 **Online monitoring of the laser brazing of titanium overlap joints** [6616-91]
R. Schmitt, K. Vielhaber, D. Donst, F. Klocke, Fraunhofer Institute for Production Technology
(Germany)
- 6616 3A **Fiber optic strain measurement for machine monitoring** [6616-92]
L. Hoffmann, M. S. Mueller, A. W. Koch, Technische Univ. Muenchen (Germany)
- 6616 3B **Interference microscopes for tribology and corrosion quantification** [6616-84]
E. Novak, N. Blewett, T. Stout, Veeco Instruments, Inc. (USA)

NONDESTRUCTIVE TESTING: POSTER SESSION

- 6616 3C **Fiber-optic-based sensors design to test concrete structures** [6616-131]
V. Micó, M. L. Lozano, J. J. Esteve-Taboada, J. A. Carrión, T. Molina-Jiménez, S. Simón,
E. Pérez, AIDO-Technological Institute of Optics, Colour and Imaging (Spain); J. M. Lloris,
M. Cruz-Yusta, M. J. López-Tendero, C. Silvestre, F. López, AIDICO-Technological Institute of
Construction (Spain); D. Barrera-Villar, R. García-Olcina, S. Sales, Univ. Politècnica de
València (Spain)
- 6616 3D **Performance of optical speckle displacement technique near stress concentrators**
[6616-132]
L. I. Muravsky, Karpenko Physico-Mechanical Institute (Ukraine) and Technical Univ. of Lodz
(Poland); O. M. Sakharuk, Karpenko Physico-Mechanical Institute (Ukraine);
S. O. Kostyukevych, Lashkaryov Institute of Semiconductor Physics (Ukraine);
O. P. Maksymenko, Karpenko Physico-Mechanical Institute (Ukraine); K. V. Kostyukevych,
Lashkaryov Institute of Semiconductor Physics (Ukraine)
- 6616 3E **Phase-only SLM as a reference element in Twyman-Green laser interferometer for MEMS
measurement** [6616-133]
J. Kacperski, M. Kujawinska, Warsaw Univ. of Technology (Poland)
- 6616 3F **Validation of an algorithm for wave propagations in graded materials with an analytical
solution** [6616-134]
L. Aeby, K. Löffel, J. Vollmann, J. Dual, ETH Zurich (Switzerland)
- 6616 3G **Optical fiber sensors in health monitoring of composite high-pressure vessels for hydrogen**
[6616-135]
P. Gąsior, J. Kaleta, A. Sankowska, Wrocław Univ. of Technology (Poland)

- 6616 3H **Feasibility study of in-process weld quality control by means of scanning laser profilometry** [6616-136]
M. Jezeršek, I. Polajnar, J. Diaci, Univ. of Ljubljana (Slovenia)
- 6616 3I **Performance of a fiber optic ring depolarizer in fiber sensing applications** [6616-137]
M. S. Mueller, L. Hoffmann, A. W. Koch, Technische Univ. Muenchen (Germany)

APPLICATIONS

- 6616 3J **Laser ultrasound: a flexible tool for the inspection of complex CFK components and welded seams (Invited Paper)** [6616-82]
C. von Kopylow, O. Focke, M. Kalms, Bremer Institut für Angewandte Strahltechnik (Germany)
- 6616 3K **Multi-technique platform for dynamic and static MEMS characterisation** [6616-83]
K. Gastinger, SINTEF ICT (Norway); P. Løvhaugen, Norwegian Univ. of Science and Technology (Norway); Ø. Skotheim, SINTEF ICT (Norway); O. Hunderi, Norwegian Univ. of Science and Technology (Norway)
- 6616 3L **Terahertz multiwavelength phase imaging without 2π ambiguity** [6616-26]
Y. Zhang, L. Zhang, C. Zhang, Capital Normal Univ. (China)
- 6616 3M **Fiber-coupled THz spectroscopy for monitoring polymeric compounding processes** [6616-27]
N. Vieweg, N. Krumbholz, T. Hasek, R. Wilk, Technische Univ. Braunschweig (Germany) and Joint Optical Metrology Ctr. (Germany); V. Bartels, C. Keseberg, V. Pethukhov, M. Mikulics, Technische Univ. Braunschweig (Germany); L. Wetenkamp, Fachhochschule Stralsund (Germany); M. Koch, Technische Univ. Braunschweig (Germany) and Joint Optical Metrology Ctr. (Germany)
- 6616 3N **Inspection of plastic weld joints with terahertz imaging** [6616-98]
S. Wietzke, N. Krumbholz, C. Jördens, Technische Univ. Braunschweig (Germany) and Joint Optical Metrology Ctr. (Germany); B. Baudrit, M. Bastian, Süddeutsches Kunststoff-Zentrum (Germany); M. Koch, Technische Univ. Braunschweig (Germany) and Joint Optical Metrology Ctr. (Germany)
- 6616 3P **On-axis non-contact measurement of glass thicknesses and airgaps in optical systems with submicron accuracy** [6616-95]
R. Wilhelm, A. Courteville, F. Garcia, F. de Vecchi, Fogale Nanotech (France)
- 6616 3Q **Multiscale segmentation method for small inclusion detection in 3D industrial computed tomography** [6616-93]
G. Zauner, B. Harrer, D. Angermaier, M. Reiter, J. Kastner, Upper Austria Univ. of Applied Sciences (Austria)
- 6616 3R **Polarization metrology of speckle-reconstructed biological layers roughness** [6616-97]
I. Z. Misevitch, Chernivtsi Arton Lab. (Ukraine); Y. Ushenko, A. G. Ushenko, Chernivtsi National Univ. (Ukraine)
- 6616 3S **Shape and vibration measurement of fast rotating objects employing novel laser Doppler techniques** [6616-86]
T. Pfister, P. Günther, L. Büttner, J. Czarske, Dresden Univ. of Technology (Germany)

APPLICATIONS: POSTER SESSION

- 6616 3U **AIT of optical payloads in Thales Alenia Space-F: an experience of more than 20 years** [6616-139]
R. Thibout, H. Benard, S. Delmonte, J.-P. Chessel, Thales Alenia Space (France)
- 6616 3X **Depth tracing the influence of oxygen on UV curing** [6616-142]
S. Pieke, W. Heering, Univ. Karlsruhe (Germany)
- 6616 3Y **XtremeFringe: state-of-the-art software for automatic processing of fringe patterns** [6616-143]
J. A. Quiroga, Univ. Complutense de Madrid, Ciudad Univ. (Spain); D. Crespo, Indizen Optical Technologies (Spain); J. A. Gomez-Pedrero, Univ. Complutense de Madrid, Ciudad Univ. (Spain)
- 6616 40 **Optical and contact non-destructive measurement of the laser re-melting layers** [6616-145]
H. Chmelíčková, H. Lapšanská, H. Hiklová, M. Havelková, Joint Lab. of Optics of Palcký Univ. and Institute of Physics (Czech Republic); R. Medlín, P. Beneš, Univ. of West Bohemia (Czech Republic)
- 6616 41 **Laser metrology of statistical and fractal structure of biological tissues polarization images** [6616-146]
O. Angelsky, A. Prydij, A. Ushenko, Y. Ushenko, O. Olar, Chernivtsi National Univ. (Ukraine)
- 6616 42 **Metrology of biological tissue coherent images by means of estimation of complex degree of mutual polarization** [6616-147]
I. Z. Misevitch, Chernivtsi Arton Lab. (Ukraine); A. G. Ushenko, Y. A. Ushenko, Y. Yu. Tomka, Chernivtsi National Univ. (Ukraine)
- 6616 43 **Mass transfer studies in transparent liquid solutions by polarization imaging** [6616-148]
V. K. Chhaniwal, Indian Institute of Technology (India); B. S. Chakrabarty, M.S. Univ. of Baroda (India); A. Anand, Institute for Plasma Research (India)
- 6616 44 **Digital Shack-Hartmann Wavefront Sensor for toroidal surface measurement** [6616-150]
N. Bai, L. P. Zhao, X. Li, Z. P. Fang, Singapore Institute of Manufacturing Technology (Singapore)
- 6616 45 **Optical metrology devices for high-power laser large optics** [6616-151]
J. Daurios, S. Bouillet, G. Gaborit, J. C. Poncetta, Commissariat à l'Energie Atomique (France)
- 6616 46 **Purity of iodine cells in relation to frequency shift of iodine stabilized Nd:YAG laser** [6616-152]
J. Hrabina, F. Petrů, P. Jedlička, O. Číp, J. Lazar, Institute of Scientific Instruments (Czech Republic)
- 6616 47 **Total spectral radiant flux measurements on Xe excimer lamps from 115 nm to 1000 nm** [6616-154]
K. E. Trampert, M. Paravia, R. Daub, W. Heering, Univ. Karlsruhe (Germany)

- 6616 48 **Efficient LED spatial measurement to improve optical modeling** [6616-155]
P. Blanco, Simulacions Òptiques (Spain); A. Cifuentes, Simulacions Òptiques (Spain) and Technical Univ. of Catalunya (Spain); J. Arasa, C. Pizarro, S. Royo, Technical Univ. of Catalunya (Spain)
- 6616 49 **Adopting our heterodyne interferometer with sub-nm sensitivity for industrial position metrology** [6616-156]
T. Schuldt, Humboldt-Univ. zu Berlin (Germany) and Hochschule für Technik, Wirtschaft und Gestaltung (Germany); M. Gohlke, Humboldt-Univ. zu Berlin (Germany) and EADS-Astrium GmbH (Germany); D. Weise, EADS-Astrium GmbH (Germany); A. Peters, Humboldt-Univ. zu Berlin (Germany); U. Johann, EADS-Astrium GmbH (Germany); C. Braxmaier, Hochschule für Technik, Wirtschaft und Gestaltung (Germany) and EADS-Astrium GmbH (Germany)
- 6616 4A **Thin film thickness measurement by double laser interferometry** [6616-157]
M. Domingo, C. Millán, M. A. Satorre, J. Cantó, Univ. Politècnica de Valencia (Spain)
- 6616 4B **3D digitising using structured illumination: application to mould redesign** [6616-158]
L. Granero, J. Sánchez, V. Micó, J. J. Esteve, J. Hervás, S. Simón, E. Pérez, AIDO-Instituto Tecnológico de Óptica, Color e Imagen (Spain)
- 6616 4C **Measurement of index of refraction of air by optical frequency method** [6616-159]
R. Šmíd, M. Čížek, Z. Buchta, B. Mikel, J. Lazar, O. Číp, Institute of Scientific Instruments (Czech Republic)
- 6616 4D **Force plate for measuring small animal forces by digital speckle pattern interferometry** [6616-161]
M. P. Arroyo, J. A. Bea, N. Andrés, R. Osta, M. Doblaré, Univ. de Zaragoza (Spain)
- 6616 4E **Design of an optical scanner for real-time on-line measurement of wood-panel profiles** [6616-162]
P. Castellini, A. Bruni, N. Paone, Univ. Politecnica delle Marche (Italy)
- 6616 4F **Particles size measurement by spectrophotometric method** [6616-163]
D. Fontani, F. Francini, P. Sansoni, D. Jafrancesco, L. Mercatelli, Istituto Nazionale di Ottica Applicata, CNR (Italy)
- 6616 4G **Absolute interferometric measurement of flatness: application of different methods to test a 600mm diameter reference flat** [6616-164]
F. Morin, S. Bouillet, Commissariat a l'Energie Atomique (France)
- 6616 4H **Determination of lens parameters with digital holography** [6616-165]
V. K. Chhaniwal, Indian Institute of Technology (India); A. Anand, Institute for Plasma Research (India)

Author Index

Conference Committee

Symposium Chairs

Wolfgang Osten, Universität Stuttgart (Germany)
Małgorzata Kujawińska, Politechnika Warszawska (Poland)
Ralph P. Tatam, Cranfield University (United Kingdom)

Conference Chair

Wolfgang Osten, Universität Stuttgart (Germany)

Conference Cochairs

Christophe Gorecki, Université de Franche-Comté (France)
Erik L. Novak, Veeco Instruments, Inc. (USA)

Program Committee

Armando Albertazzi Gonçalves, Jr., Universidade Federal de Santa Catarina (Brazil)
Oleg V. Angelsky, Yuriy Fedkovych Chernivtsi National University (Ukraine)
Anand K. Asundi, Nanyang Technological University (Singapore)
Harald Bosse, Physikalisch-Technische Bundesanstalt (Germany)
Peter J. de Groot, Zygo Corporation (USA)
Pietro Ferraro, Istituto Nazionale di Ottica Applicata, CNR (Italy)
Cosme Furlong, Worcester Polytechnic Institute (USA)
Steen G. Hanson, Risø National Laboratory (Denmark)
Roland Höfling, ViALUX GmbH (Germany)
Pierre M. Jacquot, École Polytechnique Fédérale de Lausanne (Switzerland)
Gerd Jäger, Technische Universität Ilmenau (Germany)
Werner P. O. Jüptner, Bremer Institut für Angewandte Strahltechnik (Germany)
Richard M. Kowarschik, Friedrich-Schiller-Universität Jena (Germany)
Małgorzata Kujawińska, Warsaw University of Technology (Poland)
Peter H. Lehmann, Carl Mahr Holding GmbH (Germany)
Vladimir Markov, MetroLaser, Inc. (USA)
Robert Schmitt, Fraunhofer Institute for Production Technology (Germany) and RWTH Aachen (Germany)
Pierre R. L. Slangen, Ecole des Mines d'Alès (France)
Marcus Steinbichler, Steinbichler Optotechnik GmbH (Germany)
Mitsuo Takeda, The University of Electro-Communications (Japan)
Ralph P. Tatam, Cranfield University (United Kingdom)
Hans J. Tiziani, Universität Stuttgart (Germany)
Satoru Toyooka, Saitama University (Japan)

Theo T. Tschudi, Technische Universität Darmstadt (Germany)
Wim Van Paepegem, Universiteit Gent (Belgium)
Elmar Wagner, Fraunhofer Institut für Physik Meßtechnik (Germany)
Toyohiko Yatagai, University of Tsukuba (Japan)

Session Chairs

Advanced Sensor Solutions: Optical Sensors

Wolfgang Osten, Universität Stuttgart (Germany)
Christophe Gorecki, Université de Franche-Comté (France)
Ralph P. Tatam, Cranfield University (United Kingdom)
Tobias Haist, Universität Stuttgart (Germany)
Rainer Tutsch, Technische Universität Braunschweig (Germany)
Simonetta Grilli, Istituto Nazionale di Ottica Applicata, CNR (Italy)

Advanced Sensor Solutions: Phase Retrieval

Jonathan M. Huntley, Loughborough University
(United Kingdom)

Advanced Sensor Solutions: Algorithms

Seung-Woo Kim, Korea Advanced Institute of Science and Technology
(South Korea)

Shape Measurement: Interferometry

Werner P. O. Jüptner, Bremer Institut für Angewandte Strahltechnik
(Germany)

Shape Measurement: Micro and Nano Structures

Mitsuo Takeda, The University of Electro-Communications (Japan)

Shape Measurement: Wavefront Sensing

Hans J. Tiziani, Universität Stuttgart (Germany)

Shape Measurement: Inspection of Micro and Macro Structures

Richard M. Kowarschik, Friedrich-Schiller-Universität Jena (Germany)

Displacement and Strain Measurement: Static Displacements

Satoru Toyooka, Saitama University (Japan)

Displacement and Strain Measurement: Dynamic Displacements

Armando Albertazzi Gonçalves, Jr., Universidade Federal de Santa
Catarina (Brazil)

Non-Destructive Testing

Pierre R. L. Slangen, Ecole des Mines d'Alès (France)

Applications

Wim Van Paepegem, Universiteit Gent (Belgium)

Erik L. Novak, Veeco Instruments, Inc. (USA)

Poster Pops and Poster Session

Ventseslav C. Sainov, Central Laboratory of Optical Storage and
Processing of Information (Bulgaria)

Peter H. Lehmann, Carl Mahr Holding GmbH (Germany)

Introduction

Fabrication and metrology are essential components in industrial design and production engineering. Because of their outstanding advantages in comparison to conventional tactile measuring instruments, optical methods are playing an increasing role in measurement and testing for sophisticated production processes. However, the continued miniaturisation in micro and nanotechnologies and the increasing demands on the quality of industrial products present optical researchers with new challenges. What is required are measurement and inspection techniques that are very fast, robust, high-resolution, and of reasonable cost compared to the value of the products being investigated.

Optical methods combine the classical concepts of geometrical optics, interference and diffraction with the technological progress in optical system design. New light sources, beam shaping and guiding components, spatial light modulators, smart digital imaging systems, and microprocessors enable an extremely high degree of flexibility, processing speed, accuracy and measurement repeatability. Thanks to these innovative techniques, the efficiency and ease of use of optical sensors can contribute significantly to the productivity and profitability of manufacturing processes.

In continuation of the 1999, 2001, 2003, and 2005 Munich conference series (see Proc. SPIE Vol. 3824, Vol. 4398, Vol. 5144, Vol. 5856) this conference was developed to provide again an international forum for presenting the latest advances in the field of optical measurement systems for industrial inspection. Because of the growing role of optical principles and sensors for industrial inspection the call for papers distributed in September 2006 was very successful. About 180 abstracts were submitted to the organizers – again a remarkable growth in comparison to the last conference.

This volume contains 144 papers to be presented at the 2007 conference. The layout of the volume follows the presentation order and is divided into the 6 main topics of the conference:

- Advanced Sensor Solutions: Optical Sensors; Algorithms; Phase Retrieval
- Shape Measurement: Interferometry; Wavefront Sensing; Inspection of Nano, Micro, and Macro Structures
- Displacement and Strain Measurement: Static Displacements; Dynamic Displacements
- Non-Destructive Testing
- Applications

All presented posters are assigned to their particular topic.

It is evident from discussions at past events that this type of conference is of great interest to both the academic and the industrial communities. In addition, participants can immediately compare the state-of-the-art methods presented in the conference with the commercial implementations of these ideas and systems that are on display at the collocated exhibition Laser 2007.

There are many people whom we would like to thank for the success of this conference. First, we would like to express our sincere gratitude to the conference committee for their effort and continued support throughout the conference. We also thank all authors and especially the distinguished invited speakers, D. Psaltis, École Polytechnique Fédérale de Lausanne (Switzerland); R. A. Leitgeb, École Polytechnique Fédérale de Lausanne (Switzerland); P. Seitz, Swiss Center For Electronics and Microtechnology (Switzerland); C. Dunn, Texas Instruments, Inc. (USA); G. Jäger, Technische Universität Ilmenau (Germany); R. J. Pryputniewicz, Worcester Polytechnic Institute (USA); and C. von Kopylow, Bremer Institut für Angewandte Strahltechnik (Germany) for their excellent and stimulating lectures on *Liquid Optics*, *Optical Coherence Tomography*, *Photon Noise Influence in Optical Metrology*, *Properties of DMDs*, *High-Precision Measuring and Positioning Systems*, *Micro and Nano-Scale Metrology*, and *Laser Ultrasound*, respectively. Thanks are also due to the SPIE staff for their excellent cooperation during the organization of the conference and the publication of these proceedings.

**Wolfgang Osten
Christophe Gorecki
Erik L. Novak**