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Peter H. Lehmann
Wolfgang Osten
Kay Gastinger
Editors

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Introduction

Industrial production processes are characterized by increasing complexity, precision, and speed. Products are becoming smaller and smarter. They comprise more functions occupying less space and thus, there is a need for more and more demanding tolerances.

Nevertheless, it still remains true, that you can only produce as accurate as you can measure. But this is not the full truth: measurement systems are required to come at least closer to industrial production lines, at best they should be integrated. Furthermore, they shall be robust and energy as well as cost efficient. Optical metrology is often the most promising approach to these diverse challenges. For these reasons optical methods are still playing an important role for measurement and testing in times of increasing requirements and advancing capabilities of production processes.

On the other hand, strong demands steadily stimulate the development of new or improved measurement methods, strategies and configurations. Novel components such as custom made light sources, light guiding and imaging systems, light modulators, and smart camera systems support research activities in the field of optical metrology. In addition, computerization enables researchers to run complex signal and image processing algorithms even in real-time applications.

Thanks to all this, the conference on Optical Measurement Systems for Industrial Inspection remains an important platform for scientific exchange and discussion of new ideas. In continuation of the Munich conference series established more than 10 years ago (see Proceedings of SPIE Vol. 3824, 4398, 5144, 5856, and 7389), this conference is a considerable event for researchers working in the field of optical metrology. Nearly 170 submissions related to the 2010 call for papers demonstrate the international recognition of the conference. With more than 150 papers in total and 80 oral presentations the 2011 conference could hold the high number and outstanding level of contributions, which made it as successful as it is today.

The layout of this proceedings volume follows the presentation order of the conference which is divided basically into general items, methodology and applications. Traditionally the methodology contributions focus on holographic, interferometric and structured light techniques. In addition, this year there are special topics on phase retrieval and fiber optic sensors, for example. General items deal with multisensor approaches, optical profilometry, and high-speed sensors. Finally, there is a broad variety of applications comprising micro- and nanostructure measurement, measurement of optical components, systems and system alignment, distance and displacement measurement, particle

measurement, vibration measurement, nondestructive inspection and process monitoring.

All presented posters are assigned to these particular topics too. As in past conferences and again in 2011, a special session is dedicated to measurement of optical components and systems. This session will be held in cooperation with the conference on Manufacturing of Optical Components (EOSMOC 2011) organized by the European Optical Society (EOS). As a novelty the manuscripts of all contributions to this joint SPIE / EOS session will be published in this proceedings volume.

There are many people whom we would like to thank for the support of this conference. First, we would like to express our sincere gratitude to the program committee for their support in the run-up of the conference. We also thank all authors, especially the distinguished invited speakers: Pierre Slangen, Ecole des Mines d'Ales (France); Zeev Zalevsky, Bar-Ilan Institute of Nanotechnology & Advanced Materials BINA (Israel); Michael Schulz, PTB (Germany); Catherine Towers, Leeds University (United Kingdom), and Yuri Chugui, Technological Design Institute of Scientific Instrument Engineering, Siberian Branch of the Russian Academy of Sciences (Russia), for their outstanding lectures on "Digital Fresnel holography and speckle interferometry;" "Advances in the field of super-resolution;" "Some aspects of error Influences in interferometric measurements of optical surface forms;" "Extended range metrology;" and "3D optical measuring and laser technologies."

Finally, many thanks are also due to the SPIE staff for their excellent and cooperative work during the conference organization and the publication of these proceedings.

Peter H. Lehmann
Wolfgang Osten
Kay Gastinger