

Preface

21 years ago it was a joint idea with Hans Rottenkolber to organize a workshop dedicated to the discussion of the latest results in the automatic processing of fringe patterns. This idea was promoted by the insight that automatic and high precision phase measurement techniques will play a key role in all future industrial and scientific applications of optical metrology. A couple of months later more than 50 specialists from East and West met in East Berlin, the capital of the former GDR, to spend 3 days with the discussion of new principles of fringe processing. In the stimulating atmosphere the idea was born to repeat the workshop and to organize the meeting in an olympic schedule. And thus meanwhile 20 years have been passed and we have today Fringe number six. However, such a workshop takes place in a dynamic environment. Therefore the main topics of the previous events were always adapted to the most interesting subjects of the new period. In 1993 the workshop took place in Bremen and was dedicated to new principles of optical shape measurement, setup calibration, phase unwrapping and nondestructive testing, while in 1997 new approaches in multi-sensor metrology, active measurement strategies and hybrid processing technologies played a central role. 2001, the first meeting in the 21st century, was focused to optical methods for microm measurements, hybrid measurement technologies and new sensor solutions for industrial inspection. In 2005 the fifth workshop was organized in Stuttgart, the capital of the state of Baden-Württemberg and the centre of a region with a long and remarkable tradition in machine construction, vehicle manufacturing and optics. Thus after Berlin 1989, Bremen 1993, 1997 and 2001, Stuttgart was the third Fringe city where international experts met each other to share new ideas and concepts in optical metrology. And this will be continued in 2009.

This volume contains the papers presented during **FRINGE 2009**. The focus of this meeting is especially directed to *digital wavefront engineering, resolution enhanced technologies, 4D methods addressing applications from macro to nano considering dynamic changes, sensor fusion* and new advances in *the unification of modeling, simulation and experiment*. Since optical metrology becomes more and more important for industrial inspection, sophisticated *sensor systems* and their applications for the solution of challenging measurement problems are chosen again as one of the central topics of the workshop. This extended scope was honored by a great response on our call for papers. Scientists from all

around the world offered more than 150 papers. This enormous response demanded a strong revision of the papers to select the best out of the overwhelming number of excellent papers. The strong limitation of the number of papers which can be presented orally and discussed effectively during a workshop without holding parallel sessions was again an important orientation.

The papers presented in this workshop are summarized under 5 topics:

1. New Methods and Tools for Data Acquisition and Processing
2. Application Enhanced Technologies
3. 4D Optical Metrology over a Large Scale Range
4. Hybrid Measurement Techniques
5. New Optical Sensors and Measurement Systems

As in the former workshops, each topic is introduced by an acknowledged expert who gives an extensive overview and a report of the state of the art. The classification of all submitted papers into these topics was again a difficult job which often required compromises. We hope that our decisions will be accepted by the audience. On this occasion we would like to express our deep thanks to the international program committee for helping us to find a good solution in every situation.

The editors would like to express their thanks to all the authors who spent a lot of time and effort in the preparation of their papers. Our appreciation also goes to Eva Hestermann-Beyerle and Birgit Kollmar-Thoni from Springer Heidelberg for providing excellent conditions for the publication. Our deep thanks is directed to the members of the ITO staff. The continuous help given by Katharina Bosse-Mettler, Katja Costantino, Gabriele Grosshans, Heiko Bieger, Valeriano Ferreras Paz, Erich Steinbeißer and Michael Warber was the basis for making a successful *FRINGE 2009*. Finally, our special thanks and appreciation goes to all friends and colleagues for sharing with us again the spirit of the Fringe workshops.

Looking forward to *FRINGE 2013*.

Stuttgart and Warsaw, September 2009

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