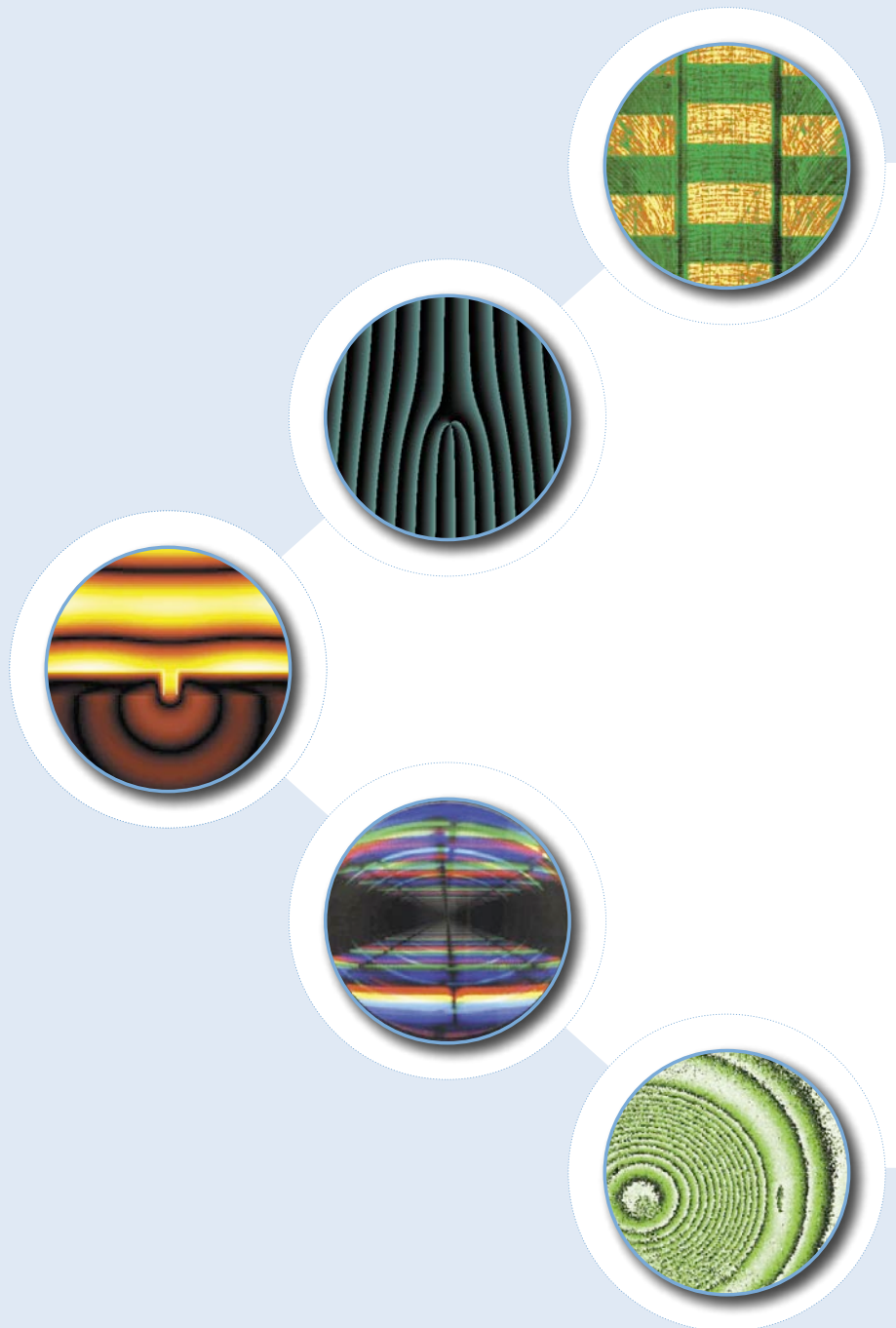




annual report  
2005 / 2006

INSTITUT FÜR  
TECHNISCHE OPTIK  
UNIVERSITÄT STUTTGART



Universität Stuttgart

## **Fringe 2005: The 5th International Workshop on Automatic Processing of Fringe Patterns**

*W. Osten*



In 1989 the time was hot to create a workshop series 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 scientific and industrial applications of optical metrology. However, such a workshop must take place in a dynamic environment. Therefore the main topics of the previous events were always adapted to the most interesting subjects of each period. In 1993 new principles of optical shape measurement, setup calibration, phase unwrapping and non-destructive testing were the focus of discussion, 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 dedicated to optical methods for micrometrology, hybrid measurement technologies and new sensor solutions

for industrial inspection. The fifth workshop took place in Stuttgart and was organized by the staff of ITO. 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.

The focus of the Stuttgart meeting was in particular directed to resolution enhanced technologies, new approaches in wide scale 4D optical metrology and advanced computer aided measurement techniques. Since optical metrology becomes more and more important for industrial inspection, sophisticated sensor systems and their applications for the solution of challenging measurement problems were chosen again as one of the central topics of the workshop. This extended scope was honored again by a great response on our call for papers. Scientists from all around the world offered more than 110 papers which were summarized under 5 topics:

- New Methods and Tools for Data Processing,
- Resolution Enhanced Technologies,
- Wide Scale 4D Optical Metrology,
- Hybrid Measurement Technologies,
- New Optical Sensors and Measurement Systems.

Each session was introduced by an acknowledged expert who gave an extensive overview of the topic and a report of the state of the art. All papers are published in the proceedings which were printed by Springer [1].

The organizers and the whole audience appreciated the presentations of many internationally recognized scientists such as Malgorzata Kujawinska, Karl Stetson, Rene Dändliker, Walter Schumann, Cesar Sciammarella, Josef Braat, Mitsuo Takeda, Toyohiko Yatagai, Ichirou Yamaguchi, Leonid Yaroslavsky and Jim Trolinger. Since the early beginning of the Fringe series it has been a good tradition to distinguish deserved scientists with honorary lectures. In 2005 Walter Mirande was awarded with the honorary lecture while Rajpal Sirohi was selected to present the key note at the banquet. On occasion of the Stuttgart conference the Hans Steinbichler award was presented for the first time by his son Marcus Steinbichler. The winner of the 2005 price was Johannes Schwider, an internationally acknowledged expert in optical interferometry, for his numerous contributions to the field over many years of active scientific work.

The engagement of many people is necessary to make a conference to a successful event in all aspects. Special thanks goes to the international program committee (see Figure 1) that again was a guarantee for a high class scientific meeting, with the special spirit of a workshop where people find time and space for inspiring discussions about such an exciting topic as modern optical metrology is.

Looking forward to FRINGE 2009.

- [1] Osten, W. (Ed.), *Fringe 2005. Proc. 5th Int. Workshop on Autom. Processing of Fringe Patterns*. Springer Berlin, Heidelberg, New York '05

## Optik-Kolloquium 2005

### *Innovative optische Systemkomponenten I*

*am 2. März 2005, Teilnehmer: ca. 250*

Begrüßung und Einführung	Prof. Dr. W. Osten ITO, Universität Stuttgart
Stand und Perspektiven plasmabasierter XUV-Quellen	Prof. Dr.-Ing. R. Poprawe Fraunhofer-Institut für Lasertechnik ILT, Aachen
Thermisch beeinflusste Strahlformung in Festkörperlasern	Prof. Dr. Th. Graf Institut für Strahlwerkzeuge IFSW, Universität Stuttgart
Stand und Perspektiven der diffraktiven Optik	Dr. R. Brunner Carl-Zeiss Jena GmbH
Electrowetting: Fundamentale Aspekte und optische Anwendungen Physik komplexer Flüssigkeiten	Prof. Dr. F. Mugele Universität von Twente/NL
Organische Leuchtdioden und Laser	Prof. Dr. W. Kowalsky Institut für Hochfrequenztechnik, Technische Universität Braunschweig
MEMS Mikrospiegel Arrays zur adaptiv optischen Phasenkontrolle	Dr. A. Gehner Fraunhofer Institut für Photonische Mikrosysteme, Dresden
DMD Mikrospiegelsystem – Eigenschaften und Potential für optische Technologien	Dr. R. Höfling VIALUX GmbH, Chemnitz
Mikrodisplays für Anzeigen und optische Anwendungen	Prof. Dr. N. Frühauf Lehrstuhl für Bildschirmtechnik LFB, Universität Stuttgart
Stand und Perspektiven der CMOS-Sensortechnik	Prof. Dr. B. Höfflinger IMS-Chips, Stuttgart
Photoadressierbare Polymere zur holographischen Datenspeicherung in Hochsicherheitsanwendungen	Dr. Stephan Völkening Bayer Innovation GmbH, Düsseldorf
Ein endoskopischer Sensor zur Form- und Verformungsmessung	Dr. C. von Kopylow BIAS GmbH, Bremen
Moderne Modulatoren in der optischen Mikromanipulation	M. Reicherter Institut für Technische Optik ITO, Universität Stuttgart

## Optik-Kolloquium 2006

### *Innovative optische Systemkomponenten II*

*am 22. Februar 2006, Teilnehmer: ca. 250*

Begrüßung und Einführung	Prof. Dr. W. Osten ITO, Universität Stuttgart
Ultrapräzise Asphären: Moderne Fertigungsverfahren und Anforderungen an die Messtechnik	M. Haag-Pichl, G. Schneider Schneider Optikmaschinen, Steffenberg
Hochleistungsobjektive für die Immersionsmikroskopie	Dr. T. Sure, P. Euteneuer, Dr. W. Vollrath Leica Microsystems SG, Wetzlar
Entwurf und Realisierung von Freiform-Mikrooptiken für die Strahlformung	Prof. Dr. K.-H. Brenner Lehrstuhl für Optoelektronik, Universität Mannheim
CCD- und CMOS Kamerasysteme und ihre Eigenschaften im UV-Bereich des Spektrums	Dr. G. Holst PCO AG, Kelheim
Photorefraktive Optik: neue photonische Komponenten durch nichtlineare Brechungsindexänderungen	Prof. Dr. C. Denz Institut für Angewandte Physik Westfälische Wilhelms-Universität Münster
Phase-Retrieval in System-Metrologie und Phasenmikroskopie	Dr. H. Gross Carl Zeiss AG, Oberkochen
Optische Sensorik für Fahrerassistenzsysteme	Dr. H. Winter Aglaiia GmbH, Berlin
HoloGraphics: Kombination von optischen Hologrammen und interaktiver Computer Grafik	Prof. Dr. O. Bimber Augmented Reality, Bauhaus Universität Weimar
3D Gesichtserkennung mittels ultraschneller Holographie	Prof. Dr. P. Hering Stiftung caesar, Bonn
Anwendungsmöglichkeiten moderner räumlicher Lichtmodulatoren	Dr. T. Haist ITO, Universität Stuttgart
Diffraktive Optik für miniaturisierte Sensorik	C. Pruß ITO, Universität Stuttgart

## **Fest-Kolloquium Optik 2006**

*Optische Technologien –*

*Innovation und Produktion am Standort Deutschland*

*ITO-Festkolloquium aus Anlass des 70. Geburtstages von*

*Herrn Prof. Dr. H. Tiziani*

*und der Eröffnung der neuen Mess- und Reinräume*

*am 7. Juli 2006, Teilnehmer: ca. 350*

Eröffnung	Prof. Dr. W. Osten ITO, Universität Stuttgart
Begrüßung	Prof. Dr.-Ing. Prof. E.h. Dr. h.c. mult. Engelbert Westkämper Dekan der Fakultät Maschinenbau, Universität Stuttgart
Congratulations from the SPIE –the Int. Society for Optical Engineering	Prof. Dr. M. Kujawska Immediate Past President of SPIE
Strategien zur Sicherung von Produktion und Arbeitsplätzen am Standort Deutschland im Bereich der optischen Technologien	Ministerialrat W. Kraus Referatsleiter im BMBF
Moderne optische Technologien in der Medizintechnik und Augenoptik	Dr. M. Kaschke Mitglied des Vorstandes der Carl Zeiss AG
Die enge Kooperation zwischen Wissenschaft und Industrie auf dem Gebiet der Optik als Innovationstreiber und Wirtschaftskraft	N. Thiel Mitglied des Vorstandes der JENOPTIK AG
Flexibilität durch Innovation und Produktion in Deutschland	Dr. R. Bauer Mitglied des Vorstandes der Sick AG

## Optik-Kolloquium 2007

### *Innovation in der Medizintechnik durch Optische Technologien*

*am 28. Februar 2007, Teilnehmer: ca. 250*

Begrüßung und Einführung	Prof. Dr. W. Osten ITO, Universität Stuttgart
Bildgestützte Femtosekundenlaser-Chirurgie in der Augenheilkunde	Prof. Dr. J. Bille URZ, Universität Heidelberg
Neue Entwicklungen der Kohärenztomografie in der Augenheilkunde	Prof. A. Fercher Institut für Sensor- und Aktuatorssysteme, Universität Wien
Moderne Anwendungen der Optik in der Ophthalmologie	Dr. M. Wiechmann Carl Zeiss Meditec AG, Jena
Spezial-Lichtleiter-Applikationen für medizinische Anwendungen	Prof. Dr. R. Hibst ILM, ULM
3D-Messtechniken für die Zahnmedizin	Dr. J. Pfeiffer SIRONA Dental Systems, Bensheim
Leica TCS 4PI - Funktion und Anwendungen der 4PI Mikroskopie	Dr. T. Szellas, Dr. T. Zapf Leica Microsystems GmbH, Wetzlar
Smart textiles für den Bereich Life-Science	Prof. Dr. H. Planck Institut für Textil- und Verfahrenstechnik, Denkendorf
Bildsensoren für die Medizintechnik	Dr. C. Harendt IMS Chips, Stuttgart
Digitalholografische Mikroskopieverfahren zur markerfreien quantitativen Lebendzellenanalyse	Dr. B. Kemper, Prof. G. v. Bally Labor für Biophysik, Universität Münster
Optische 3D-Sensorik in der Medizintechnik	Dr. E. Papastathopoulos Institut für Technische Optik, Universität Stuttgart
Digitalholografische Endoskopie zur Gewinnung von Gewebeeigenschaften	Dr. G. Pedrini Institut für Technische Optik, Universität Stuttgart

## Dr. Stephan Reichelt receives the Frankowski Award



The ITO-Kolloquium of 2007 provided the dignified setting for the bestowal of the Gottfried-Frankowski award for the first time. This newly established prize is awarded for innovative development and research in the field of optical 3D metrology. It was founded by the GFMesstechnik GmbH, Teltow with the aim of promoting young scientists in particular.

This year's winner is Dr. Stephan Reichelt for his dissertation "Interferometrische Optikprüfung mit computergenerierten Hologrammen", which describes absolute interferometric testing procedures for aspheric optics and computer generated holograms. These new measurement methods allow the testing of aspheric surfaces to an accuracy that was achieved previously only for flat or spherical elements.

Dr. Reichelt was studied mechanical engineering at the Universities of Chemnitz and Stuttgart. He wrote his doctoral thesis at the Institut für Technische Optik (ITO) receiving his PhD in 2004.

A postdoctoral research position followed at the Institut für Mikrosystemtechnik (IMTEK), University of Freiburg. He is now with the company SeeReal Technologies GmbH in Dresden.

In his acceptance speech he thanked Gottfried Frankowski and the referees committee and stressed, that this award would be both an appreciation for his past achievements so far as well as a high motivation for his future work. Furthermore he expressed thanks to his teachers in optics, Prof. Tiziani and Prof. Osten, as well as to his former colleagues of the ITO for the excellent "micro-environment" at the Institute which is a prerequisite in pursuing new scientific ideas with the necessary care and endurance. He also highly valued the "macro-environment" around the Institute that is required at the same time to develop new ideas and to identify real research topics. Therefore he thanked project partners, the German Ministry for Research and Education (BMBF) and the optical community in the audience for all the support that was received.

## **Organized International Conferences: 2005 – 2006**

W. Osten:

### **Optical Measurement Systems for Industrial Inspection IV**

SPIE Congress, June 13 – 17, 2005, Munich, Germany

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W. Osten:

### **Optical Sensing and Metrology**

CLEO Europe, June 12 – 17, 2005, Munich, Germany

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W. Osten:

### **Fringe 2005**

5th International Workshop on Automatic Processing of Fringe patterns, September 9 – 14, 2005, Stuttgart, Germany

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W. Osten:

### **Optical Micro- and Nanometrology in Microsystems Technology**

April 5 – 7, 2006, Strasbourg, France

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W. Osten:

### **Interferometry XIII- Applications**

SPIE Congress, 16 – 17 August 2006, San Diego, USA

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Editor: Dipl.-Ing. (FH) Erich Steinbeißer..... [steinbeisser@ito.uni-stuttgart.de](mailto:steinbeisser@ito.uni-stuttgart.de)  
Dipl.-Des. Matthias Staufer, [mamadesign.net](http://mamadesign.net) (Graphic & Layout)..... [mail@mamadesign.net](mailto:mail@mamadesign.net)

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