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**Armando Albertazzi Gonçalves, Jr.
Guillermo H. Kaufmann**
Editors

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Yan Zhang, Nankai University (China)

Session Chairs

Speckle as a Tool in Security Techniques

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

Fringe and Data Analysis, Phase Evaluation, and Unwrapping in
Speckle Metrology

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

Digital Speckle Pattern Interferometry

Yukihiro Ishii, Tokyo University of Science (Japan)

Nondestructive Testing, Damage Detection, and Material
Characterization I

Ángel F. Doval, Universidad de Vigo (Spain)

Micro-measurements and Industrial Applications

Pascal Picart, Université du Maine (France)

Conventional and Digital Holography, and Holographic Interferometry

Ryszard J. Pryputniewicz, Worcester Polytechnic Institute
(United States)

Speckles: Theory and Fundamentals

Małgorzata Kujawińska, Warsaw University of Technology (Poland)

Nondestructive Testing, Damage Detection, and Material
Characterization II

Kay Gastinger, SINTEF (Norway)

Intellectual Property

Wolfgang Osten, Institut für Technische Optik—ITO, Universität Stuttgart
(Germany)

Low Coherence and White Speckle Interferometry

Pablo D. Ruiz, Loughborough University (United Kingdom)

Dynamic Speckle

Guillermo H. Kaufmann, Instituto de Física, Universidad Nacional de
Rosario (Argentina)

Biomedical Research and Speckle Noise Reduction

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

Closing Lecture

Fernando Mendoza Santoyo, Centro de Investigaciones en Óptica,
A.C. (Mexico)

Introduction

The invention of laser has allowed sources of light with a high degree of coherence, and seeing a new effect with a grainy aspect, which appeared when optically rough surfaces were illuminated with a laser light. After the advent of laser sources, this effect, called *speckle*, was considered a mere nuisance mainly for holography techniques. However, important research efforts began in the late 60s and early 70s, focusing on the development of new methods for performing high sensitivity measurements on diffusely reflecting surfaces. Nowadays, speckle metrology is a very rich and growing area, widely used in science and industry.

This volume contains the papers presented during the Speckle 2010, held in Florianópolis, September 13–15, 2010. This successful international conference started in 2000 in Lausanne, Switzerland, then it was held in Trondheim, Norway in 2003 and, finally, it was organized in Nîmes, France in 2006. This is the first time that the “Speckle” leaves Europe and is held in South America, more precisely in Florianópolis, Brazil.

Contributions from 72 papers from all over the world discuss the most recent theories, techniques, and data analysis approaches, as well as the state-of-the-art of different applications of the speckle effect in experimental mechanics, material science, optical testing, and developing of sensor systems.

Papers presented in this event can be grouped in eleven topics:

- Speckle as a tool in security techniques.
- Fringe analysis and data analysis techniques in speckle metrology/Phase evaluation and unwrapping.
- Digital speckle pattern interferometry.
- Nondestructive testing/Material characterization and damage detection/Shearography.
- Micro-measurements and industrial applications.
- Conventional and digital holography/ Holographic interferometry.
- Speckles, theory and fundamentals/Speckle vortices.
- Speckle photography and digital image correlation.
- Low coherence and white speckle interferometry.
- Dynamic speckle.

- Biomedical research and speckle noise reduction.

The editors would like to express their thanks to all the authors who spent a lot of time and efforts in the preparation of their papers, which were decisive for the success of the conference, to the audience for their growing interest in speckle applications and to all sponsors that made possible this event. Finally, our appreciation goes to SPIE for the publication of the proceedings.

Florianópolis, September 2010

Armando Albertazzi Gonçalves, Jr.
Guillermo H. Kaufmann