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Optics, Photonics, and Digital Technologies for Multimedia Applications

**Peter Schelkens
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Introduction

In recent years, Moore's Law has fostered the steady growth of the field of digital image processing, though computational complexity remains a significant problem for most of the digital image processing applications. At the same time, research in the field of optical image processing has matured, potentially bypassing the limitations of digital approaches and giving rise to new applications. Additionally, from the image acquisition perspective the rapid convergence of digital multimedia devices is driving a strong industrial growth of photonics technologies. Already, photonics based enablers can be found in a myriad of multimedia applications such as displays and image sensing, illumination systems, and high-performance light engines - all of which have major volume positions in the photonics market. Along with the growing interest for emerging multimedia applications the demand for new photonics enablers is steadily increasing, and new technologies are continuously created to meet the needs.

One example is the use of compact visible laser sources for laser projection systems, which are attracting considerable interest. In miniaturizing digital cameras new challenges emerge when striving for high performance combined with mass volume production. This requires the design of sophisticated lens elements and new types of imaging optics, optimized image processing pipelines, compact high-performance sensors, etc. In addition, photonics has enabled fully digital media, with accompanied growth in image processing, in multimedia storage, retrieval and transmission techniques, and in related hardware and software. These new applications all have their specific requirements and put new challenges on the optical designs.

This volume consists of the papers presented at the SPIE Photonics Europe conference on Optics, Photonics, and Digital Technologies for Multimedia Applications that took place 12–15 April 2010 in Brussels, Belgium.

This conference is the result of the merger of two conferences organized at SPIE Photonics Europe 2008, namely, 'Optical and Digital Image Processing' and 'Photonics in Multimedia.' The aim of this conference was to create a joint forum for both research and application communities to share expertise, to solve present-day application bottlenecks and to propose new application areas.

Consequently, this conference had a broad scope, ranging from basic and applied research to dissemination of existing knowledge. The contributions were grouped in sessions covering super-resolution, optical and digital image processing, image quality assessment and enhancement, steganography and watermarking for multimedia content and services, industrial processing, display

and light sources, image processing and representation, camera optics, and finally, sensing and transport.

We thank all the participants and all those who worked hard to make this conference so successful. Special thanks to all the reviewers that helped us to improve the quality of the final proceedings.

**Peter Schelkens
Touradj Ebrahimi,
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