

WOODHEAD PUBLISHING IN TEXTILES



# Wearable electronics and photonics

Edited by Xiaoming Tao



The Textile Institute

WP

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# Wearable electronics and photonics

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This book is made up of contributions from a panel of international experts in wearable electronics and photonics and covers many aspects of cutting edge research and development. It comprises eleven chapters. Chapter 1 provides background information on wearable electronics and photonics and a brief overview of existing and emerging technologies. It also explains the structure of the book. Chapters 2 to 5 discuss topics related to materials and devices. Chapter 2, contributed by Professor Frank Ko, Afaf El-Aufy and Hoa Lam of Drexel University and Professor Alan MacDiarmid of Pennsylvania University, deals with electrostatically generated nanofibres for wearable electronics. Professor Helen Lai-wa Chan, Kun Li and Professor Chung Loong Choy of the Hong Kong Polytechnic University provide a detailed review of electroceramic fibres and composites in Chapter 3. Professor Danilo De Rossi and his colleagues from Pisa University write about electroactive fabrics and wearable man–machine interfaces in Chapter 4. Chapter 5 summarises recent developments by the editor’s group in the fundamental aspects of electrically conductive fabric structures and puts together a few theoretical treatments of the electromechanical properties of various fabric structures.

Chapters 6, 7 and 8 are devoted to topics related to wearable photonics. Professor Mahmoud El-Sherif of Drexel University writes about embedded fibre optic sensors and integrated smart textile structures in Chapter 6. In Chapter 7 the editor presents a review of various flexible photonic display technologies and their development. Professor Vladan Koncar from ENSAIT describes communication apparel and optical fibre fabric displays in Chapter 8.

Chapters 9 and 10 focus on integrated structures and system architectures. Chapter 9 was contributed by a research group from the Swiss Federal Institute of Technology in Zurich. Here Dr Tünde Kirstein and her colleagues discuss wearable computing systems. Jaana Rantanen and Dr Marko Hännikäinen from Tampere University of Technology in Finland provide an overview of the requirements and potential technologies for data transfer in wearable electronics clothing in Chapter 10.

Chapter 11, written by Dr Sharon Baurley of Central Saint Martins College of Art and Design, describes various issues that fashion designers face when involved in the design and creation of wearable electronics and photonics.

This book provides a window through which a part of the exciting, emerging technology can be seen. The possibilities offered by wearable technology are remarkable and widespread. Even as this book was being prepared, many new advances were achieved around the world. It is the hope of the editor and contributors that this book will help researchers and designers to make their dreams a reality.

The editor is grateful to the Hong Kong Research Grants Council and The Hong Kong Polytechnic University for their partial funding support. In particular, the editor wishes to thank Dr Pu Xue for her assistance in compiling this book.

*Xiaoming Tao*