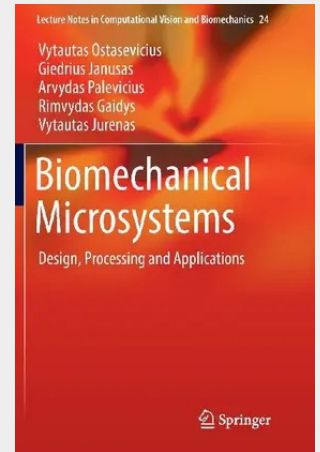


Biomechanical Microsystems

Design, Processing and Applications

This book presents the most important aspects of analysis of dynamical processes taking place on the human body surface. It provides an overview of the major devices that act as a prevention measure to boost a person's motivation for physical activity. A short overview of the most popular MEMS sensors for biomedical applications is given. The development and validation of a multi-level computational model that combines mathematical models of an accelerometer and reduced human body surface tissue is presented. Subsequently, results of finite element analysis are used together with experimental data to evaluate rheological properties of not only human skin but skeletal joints as well. Methodology of development of MOEMS displacement-pressure sensor and adaptation for real-time biological information monitoring, namely "ex vivo" and "in vitro" blood pulse type analysis, is described. Fundamental and conciliatory investigations, achieved knowledge and scientific experience about biologically adaptive multifunctional nanocomposite materials, their properties and synthesis compatibility, periodical microstructures, which may be used in various optical components for modern, productive sensors' formation technologies and their application in medicine, pharmacy industries and environmental monitoring, are presented and analyzed. This book also is aimed at research and development of vibrational energy harvester, which would convert ambient kinetic energy into electrical energy by means of the impact-type piezoelectric transducer. The book proposes possible prototypes of devices for non-invasive real-time artery pulse measurements and micro energy harvesting.

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53,49 €
49,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783319855004
Medium: Buch
ISBN: 978-3-319-85500-4
Verlag: Palgrave Macmillan
Erscheinungstermin: 09.05.2018
Sprache(n): Englisch
Auflage: Softcover Nachdruck of the original 1. Auflage 2017
Serie: Lecture Notes in Computational Vision and Biomechanics
Produktform: Kartoniert
Gewicht: 4453 g
Seiten: 282
Format (B x H): 155 x 235 mm

