“Wearable Technology in Medicine and Health Care”
Review by Norman M. Goldfarb

“Wearable Technology in Medicine and Health Care” surveys a variety of wearable-device engineering projects, from sensors to exoskeleton robots.

The book provides insights into the challenges of building such devices, such as the following excerpt:

**Biopotential Monitoring**

Biopotential recordings using textile electrodes have been a major focus of research and development. The use of conductive yarns to produce macroelectrodes capable of monitoring heart rate and generating electrocardiogram waveforms has been reported by numerous researchers. In order to obtain adequate biopotential signals, intimate skin-electrode contact is required. Appropriate textile integration techniques that help bring the electrode fibers close to the skin surface can help ensure functional sensing if the fibers are to be used as dry electrodes. Dry electrodes are desired for textile sensing systems, since repeated application of electrode gel or moisturizer is not practical for long-term and repeated recording. Poor electrode interfacing can lead to an increase in contact impedance at the skin-electrode interface, leading to poor signal recordings. Biopotential recordings require at least two conductive fiber segments to be in contact with the skin, in a configuration as shown in Fig. 8.3C. A major challenge to recording biopotentials using fiber-based sensors is the inherent impedance of small fibers. As fiber size is reduced to produce sensors that mimic common textile fibers, the reduced conductor cross-section leads to an increase in the conducting fiber resistivity. This challenge is exacerbated because of the need for conductors with flexible, textile-like properties. The incorporation of conductive materials with polymeric materials to produce conductive fiber segments results in fibers that are inherently more resistive than metallic conductors. Fibers with increased resistivity are more susceptible to electrical noise, especially when attempting to record and amplify biopotential signals with amplitudes on the order of millivolts.

The book includes 15 chapters by 49 contributors:

- Wearable Technology in Medicine and Health Care: An Introduction
- Empowering Medical Staff with Smart Glasses in Operating Rooms
- Wearable Robotics for Upper-Limb Rehabilitation and Assistance: A Review of the State-of-the-Art, Challenges and Future Research
- Upper Limb Wearable Exoskeleton Systems for Rehabilitation: State of the Art Review and Case Study of the EXO-UL8 Dual Arm Exoskeleton System
- Lower Limb Exoskeleton Robot to Facilitate the Gait of Stroke Patients
- Wearable Sensors for Upper Limb Monitoring
- Wearable Technologies and Force Myography for Healthcare
- Fiber-Based Sensors: Enabling Next-Generation Ubiquitous Textile Systems
- WearUp: Wearable Smart Textiles for Telemedicine Intervention of Movement Disorders
• A Soft Wearable Elbow Exosuit: Design Considerations
• Human Body Communication-Based Wearable Technology for Vital Signal Sensing
• Wearable Technologies for Personalized Mobile Healthcare Monitoring and Management
• Patient-Generated Health Data: Looking Toward Future Health Care
• Evolution Map of Wearable Technology Patents for Healthcare Field
• The Interplay Between Regulation and Design in Medical Wearable Technology

Reviewer
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