

## Smart Textiles and Wearable Technology: Opportunities for Life Enhancement and Health Management

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## **Abstracts**

Smart textiles and wearable technology have the potential to change the way people dress, communicate, respond to emergencies, manage their health and even entertain themselves. They could also provide a much needed boost to the textile industries in the developed world. This report provides a wealth of information including descriptions of the characteristics of smart textiles and wearable technology, the development of the industry, the materials and technologies used, projects and corporate collaborations, potential markets, and opportunities and threats in the market. It also provides an overview of the applications of smart textiles and wearable technology in a number of fields -- namely fashion, communications, entertainment and infotainment, medical and healthcare, occupational health and safety, high visibility apparel, sports, and cosmetotextiles. Furthermore, the report presents examples of innovative smart textile and wearable technology products on the market.



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#### SUMMARY

#### INTRODUCTION

#### DEFINITIONS AND CHARACTERISTICS OF SMART TEXTILES AND WEARABLE TECHNOLOGY

Smart textiles Wearable technology Wearable computers Electronic textiles Wearable electronics

#### DEVELOPMENT OF SMART TEXTILES AND WEARABLE TECHNOLOGY

#### MATERIALS AND TECHNOLOGIES USED TO MAKE SMART

#### TEXTILES AND WEARABLE TECHNOLOGY

Phase change materials Electrically conductive fibres, yarns and fabrics Shape memory materials Chromic materials Luminescent materials Energy harvesting and scavenging systems Photovoltaic materials Piezoelectric materials Thermoelectric devices Auxetic materials Shear-thickening materials Metal organic framework molecules

#### PROJECTS AND CORPORATE COLLABORATIVE VENTURES IN SMART TEXTILES AND WEARABLE TECHNOLOGY

Projects for the development of smart textiles and wearable technology Platform for Large Area Conformable Electronics by InTegration (PLACE-it)



Stretchable Electronics for Large Area Applications (STELLA) ProeTEX Corporate collaborative ventures in smart textiles and wearable technology Apple and Burton Snowboards Apple and Nike Polar Electro and Adidas Google and Apple

#### APPLICATIONS OF SMART TEXTILES AND WEARABLE TECHNOLOGY

Fashion Communications, entertainment and infotainment Medical and healthcare Wearable textile-based health monitoring systems Occupational health and safety Military and defence High visibility apparel Sports Cosmetotextiles

#### THE MARKET FOR SMART TEXTILES AND WEARABLE TECHNOLOGY

#### **OPPORTUNITIES AND THREATS IN THE MARKET**

Opportunities Shifting demographics Publicly funded research and development Increasing use of sensors and other electronics Growing popularity of smartphones and social networking sites Widespread use of Bluetooth Low Energy (BLE) technology Threats High costs Economic recession Dichotomy between the textile and electronics industries Lack of standards Power supply Sustainability concerns Product obsolescence Incompatibility between different wearable devices



# EXAMPLES OF INNOVATIVE SMART TEXTILES AND WEARABLE TECHNOLOGIES

CuteCircuit: M-Dress and Hug Shirt

Fabrican: spray-on fabric

Freer Logic: BodyWave

Orange: Sound Charge

Polytechnic School of Montreal: flexible battery

SmartLife

Under Armour: E39 shirt

ViewSport: smart gym wear

WarmX: heatable underwear

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