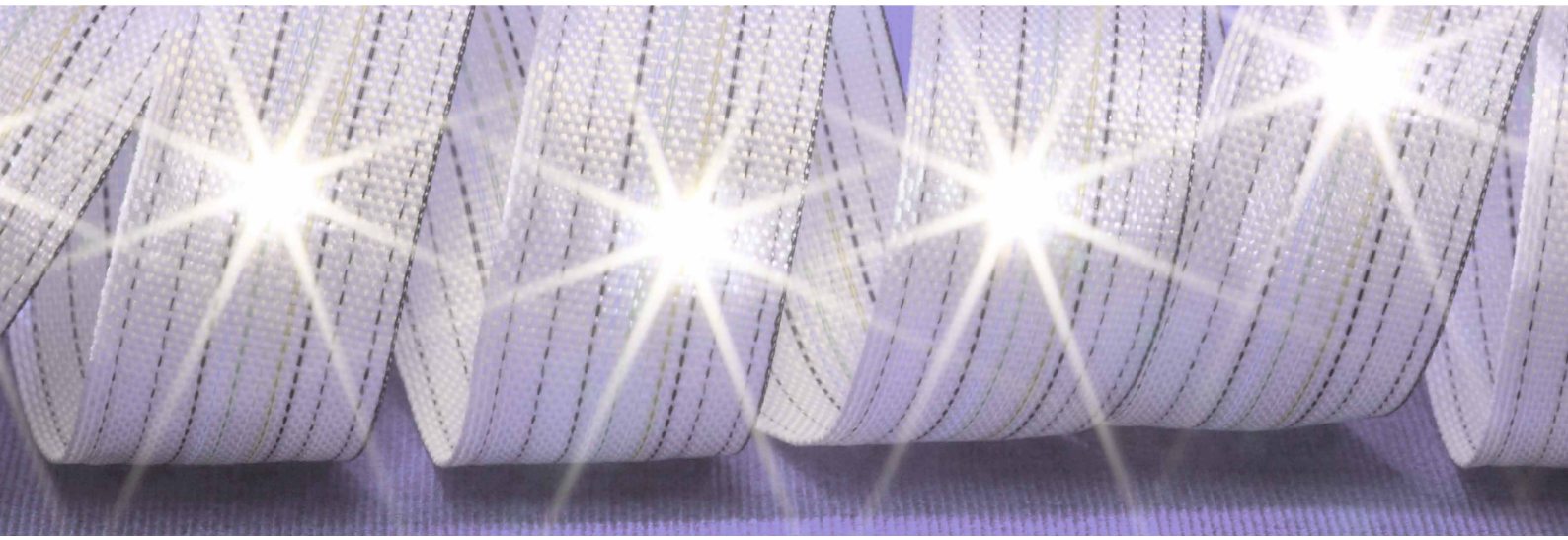
DEUTSCHE INSTITUTE FÜR
TEXTIL+FASERFORSCHUNG

E-Textiles: textile-integrated and textile-based smart materials



Narrow fabric with insulated conductors and waterproof integrated LEDs

Research topics:

- Sustainable textile-based sensors & actuators
- Integration of microsystem technology into textiles
- Joining, assembly and production technologies
- Development of electronics & signal processing
- Energy supply & energy management
- Testing methods for E-Textiles

Range of services:

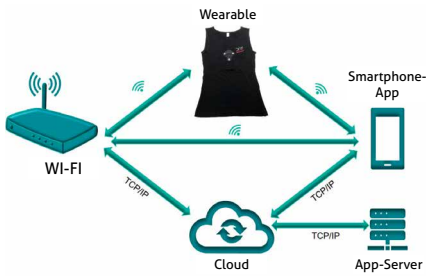
- Development of sustainable textile sensors and actuators
- Integration of microsystem technology into textiles
- Automation of manufacturing processes for E-Textiles
- Design and simulation of digital and analog circuits
- Product-oriented research (e.g. in health care, protective and geotextiles, sport and leisure, automotive sector)
- Development of new testing and characterization methods for E-Textiles
- Knowledge transfer to the industry
- Industrial pilot production for small batch series

Pressure-sensory vest for children and app for adjusting school bags

Luminous clothing from the DITF-ABK cooperation
Source: ABK Textildesign, Annika Frölich: Chakr-E, SoSe 2023

Interdisciplinary work

The complex topic of E-Textiles is being addressed through an intensive exchange between the individual research areas of the DITF. These include textile technology/textile finishing, mechanical / process engineering, electronics / electrical engineering, chemistry / physics / biology and computer science / cybernetics. This allows for the utilization of resulting synergies.



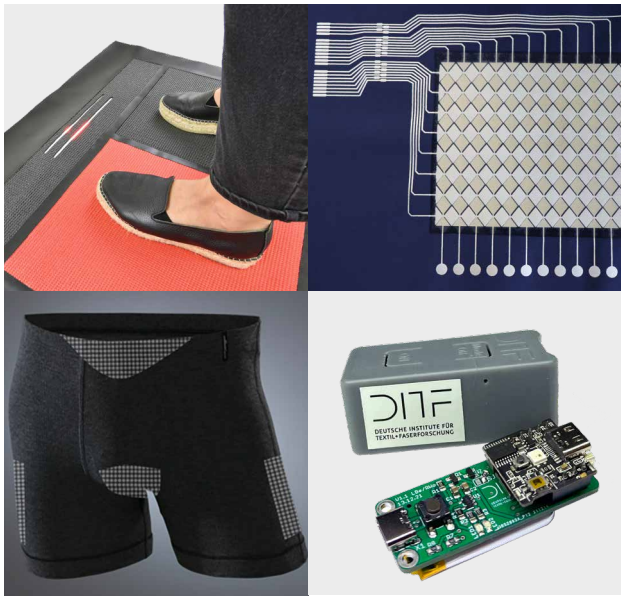
Information and reporting system for vital signs and emergency monitoring

Cooperations

E-Textiles have a wide range of applications, which necessitates a cross-industry approach. The DITF collaborate closely with other institutes and companies, especially in the areas textile and clothing technologies, electronics, mechanical and medical engineering as well as chemistry.

Fields of application for E-Textiles

The DITF's activities in the area of E-Textiles include the development and characterization of textile-integrated and textile-based sensors and actuators, automation of the manufacturing processes as well as the energy and data management. The combination with applications, algorithms and/or artificial intelligence enables the creation of smart solutions in various application areas such as health, workwear and protective clothing, sport and leisure and technical textiles (automotive, industry, construction). The focus is on the development of sustainable solutions and economically viable processes.



Top left: Pressure-sensory mat for balance training
Top right: Textile interactive pad for gesture identification
Bottom left: EMG pants with textile electrodes for pelvic floor training
Bottom right: Self-developed electronics for signal processing of a textile strain sensor

The German Institutes of Textile and Fiber Research (DITF) form the largest textile research center in Europe. From the molecule to the finished product, the DITF conduct research and develop products along the entire textile value chain, always taking into consideration the corporate processes and business models. A wide range of textile testing services, prototype construction and pilot factory complete the offer.

The Technology Center E-Textiles & Acoustics develops textiles with sensory and actuator functions as well as textiles for sound insulation and sustainable noise reduction concepts.

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