



Textile-Based Sensors and Actuators for use in the Sports and Healthcare Sectors

Smart-Tech-Textiles – Functional Textiles in Sports, 02.07.2022, Tobias Lauwigi

Institut für Textiltechnik of RWTH Aachen University



Staff and Machinery



400 scientists, technicians and research assistants

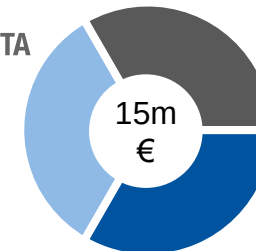


250 machines for textile processing

International Network



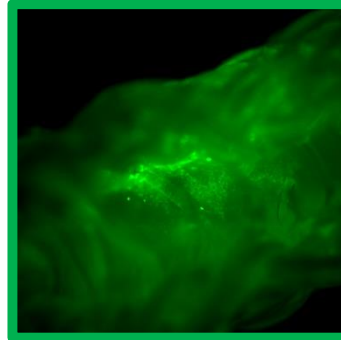
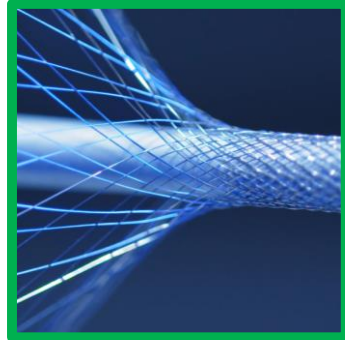
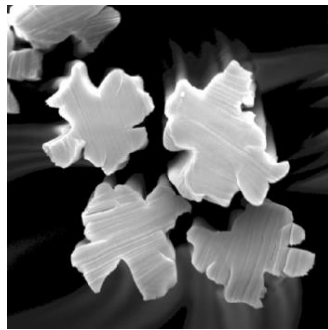
Budget



- Basic Research
- Collaborative Research
- Confidential Research



Our competencies



Fiber Spinning

Textile
Processing

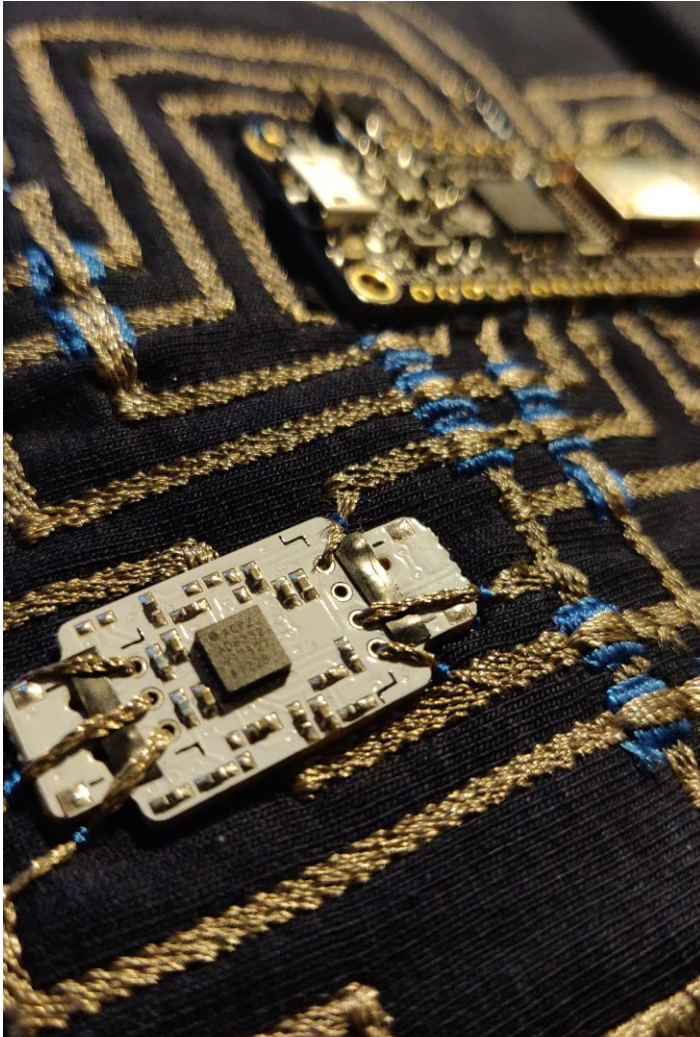
(Bio-)
Functionalization

Lab Testing

Preclinical Trials

UNIKLINIK
RWTHAACHEN

Embroidery Technology



Features

- Functionalization of textiles by applying e.g. silver coated fibers
- Embroidery of textile electrodes and sensors
- Local reinforcement and material combination

Machinery and Equipment

- Multi Head Embroidery Machine
- Tailored Fibre Placement (TFP) Machine
- Roll to Roll Printing System

Applications

- Wearable Monitoring of Vital-Parameters
 - Biopotential Measurements (ECG, EMG, EEG, ...)
 - Optical Measurements (HR, SPO2)
 - Electrical Measurements (Respiratory rate)
- Wearable Therapy Systems
 - LED-Integration for Light- Treatment (Wound, Skin, Nerves, ...)

Our experts:



Akram Idrissi

- Embroidery of Flexible Electronics
- Textile Electrode Design and Testing



Tobias Lauwigi

- Fiber Based Monitoring Systems
- 4D Textiles
- Embroidery of Smart Textiles
- Functional Printing

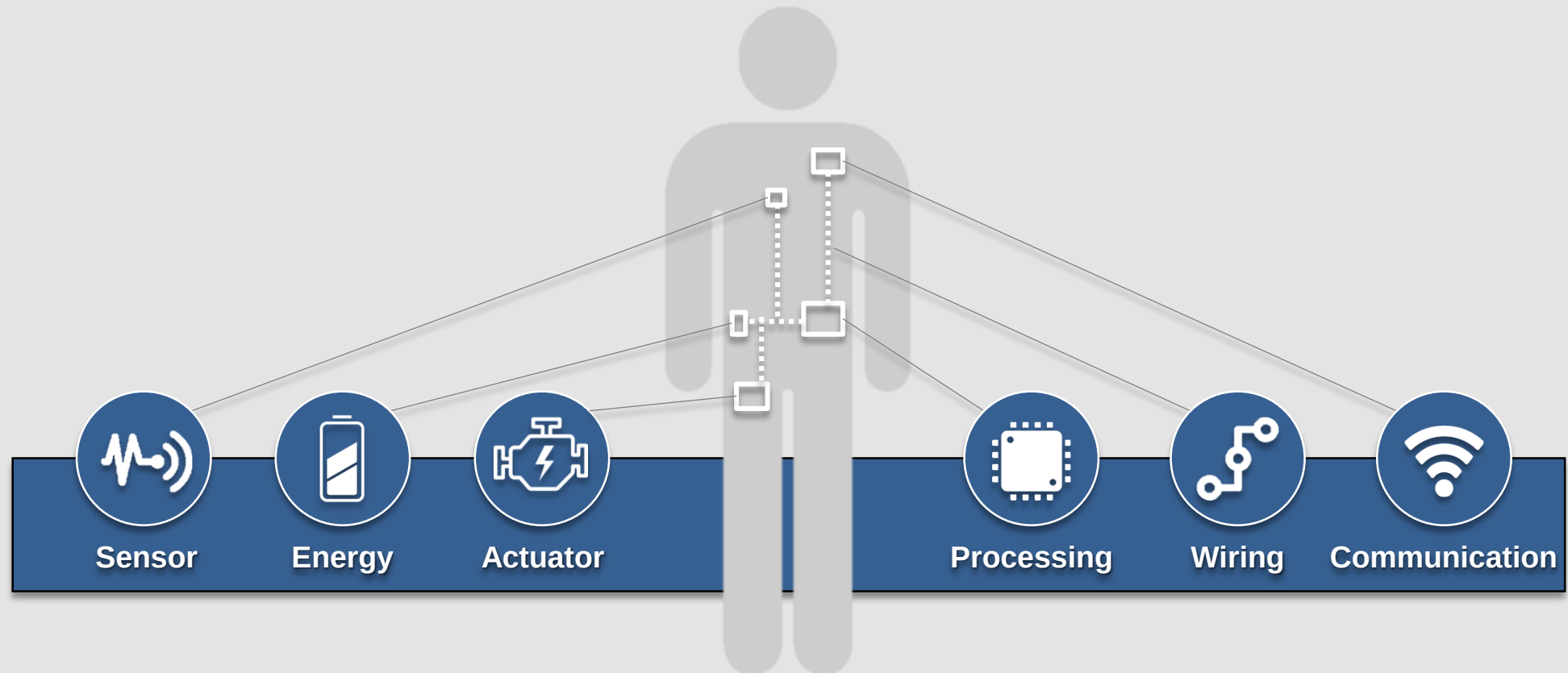
What are Smart Textiles?

“**Smart materials** and structures can be defined as the materials and structures that **sense and react** to enviromental conditions or **stimuli**”

Tao, Smart Fibres, Fabrics and Clothing, 2001

Medical Smart Textiles

Possible functions of Smart Textiles



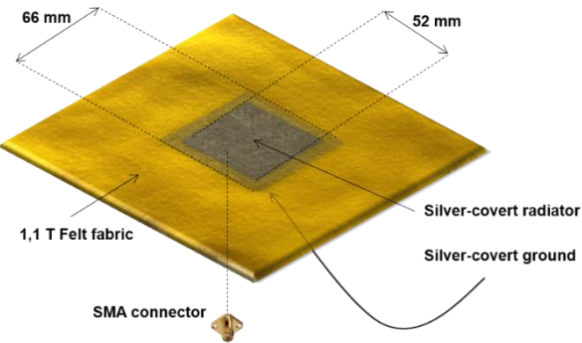
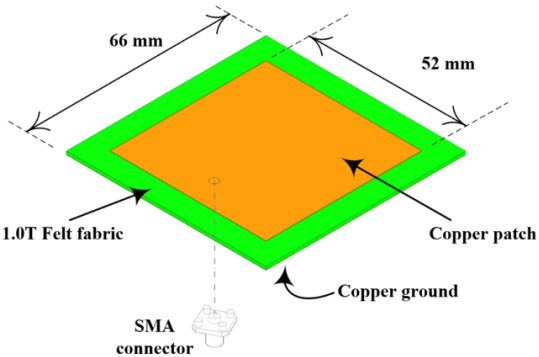


CAST - Cardiac Measuring Shirt for Telemedicine





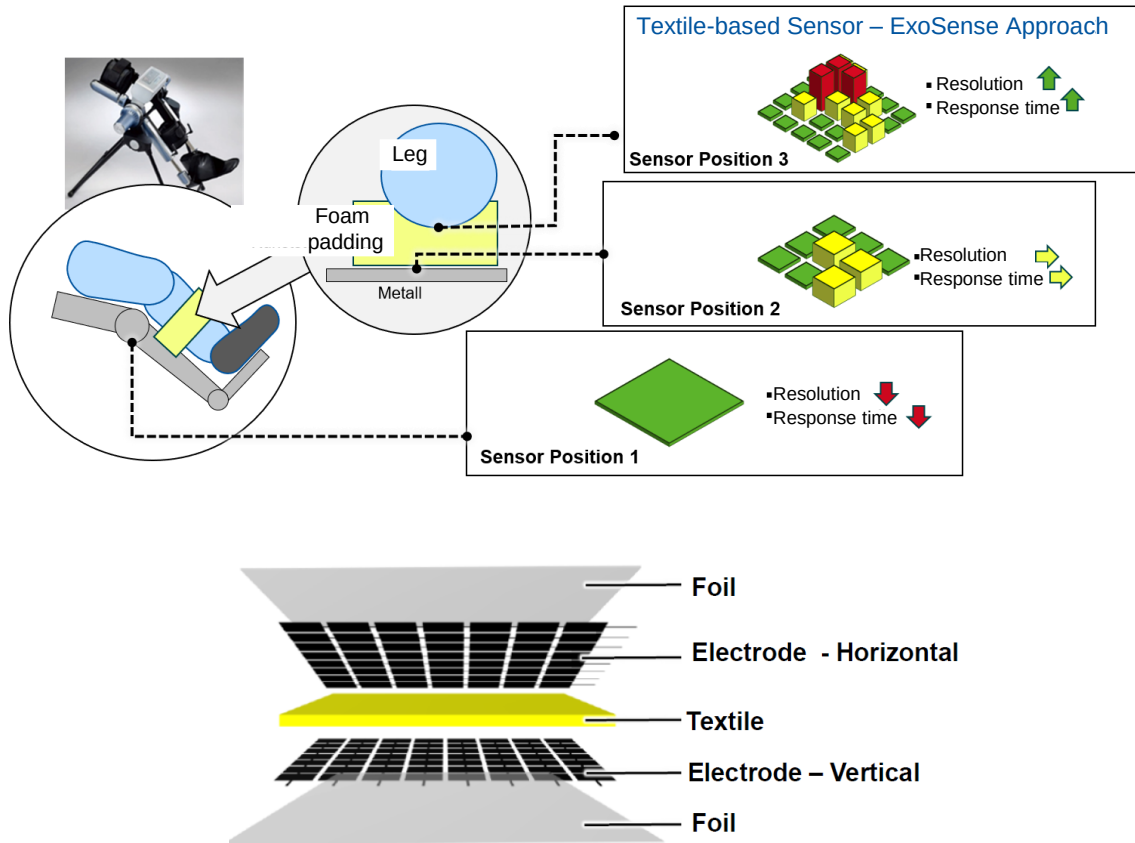
Smart Textiles – Textile Antenna



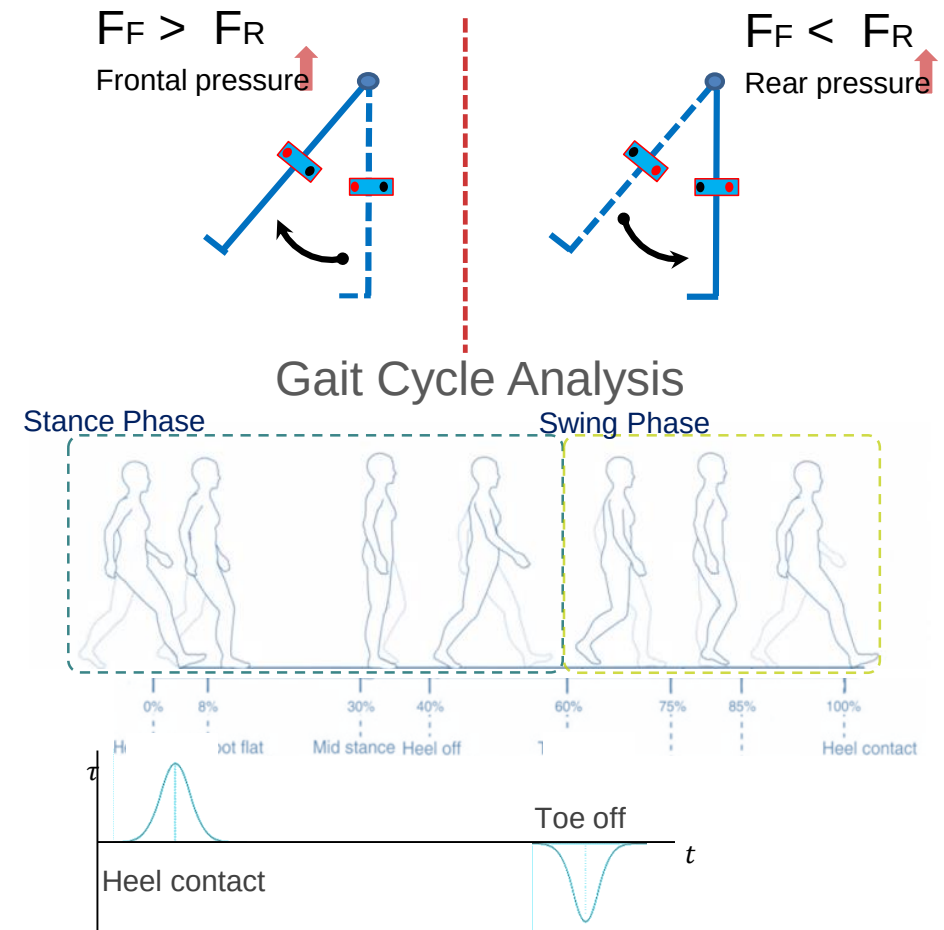


Smart Textiles – Textilebased Pressure Sensor

Textile-based Sensor Approach



Motion Intention Detection System



Tobias Lauwigi

Institut für Textiltechnik (ITA) der RWTH Aachen University
Otto-Blumenthal-Straße 1, 52074 Aachen

Phone (direct): +49 241 80-22102

Phone: +49 241 80-23401

Fax:

E-Mail: Tobias.Lauwigi@ita.rwth-aachen.de

Internet: www.ita.rwth-aachen.de

Current events: www.ita.rwth-aachen.de/events

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