

Printed Large-Area Sensors

(FEIM – Future Electronics for Industry 4.0 and Medical 4.0 project)

Objectives of the Project

The project aims to develop innovative sensors for smart textiles and large-area sensors applications with significant commercial potential. In project are used advanced materials and printing/AM technologies for gas, smart health application sensors, pressure sensors (including for gait analysis and adaptive 3D structures). The applications aim to improve monitoring, diagnostics and comfort in industry, automotive and healthcare.

Topics covered by the Project

- Large-area printed pressure sensors for orthopedic applications, adaptive 3D printed compressible lattice structures, and industrial liquid transport/storage monitoring
 - Synthesis of dispersions and preparation of conductive printing ink formulations (SWCNT) for AM and R2R printing of large-area sensor structures
 - Research SWCNT-modified textile threads for creating embroidered or woven textrodes for healthcare applications
 - Development of printed H₂ gas sensors for applications in the automotive and energy industries
 - Research into printed sensors for stool detection in smart diapers
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What will the Project Results enable?

- In-shoe printed pressure mapping sensors for orthopedic applications
 - Adaptive 3D compressible structures with variable stiffness and integrated local pressure sensing
 - High-performance textile electrodes (Textrodes) based on innovative SWCNT-enhanced threads
 - High-throughput Roll-to-Roll (R2R) printed sensors for faeces detection in smart diapers
 - Printed hydrogen (H₂) sensor for the energy and automotive industries
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Selected Results

- Functional sample of a H₂ sensing element protected by a patent
- Technology process of printing of diaper sensor for faeces detection protected by a utility model and patent
- Proven technology for fabrication of embroidered textile electrodes based on hybrid conductive threads coated by biocompatible hydrogel for ECG monitoring

- Proven technology of AM of 3D lattice structures with variable stiffness and integrated local pressure sensing
 - Proven technology of printed pressure mapping sensors for orthopedic applications
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More about FEIM project can be found on [projects webpage](#).